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Paper TRADE JOURNAL

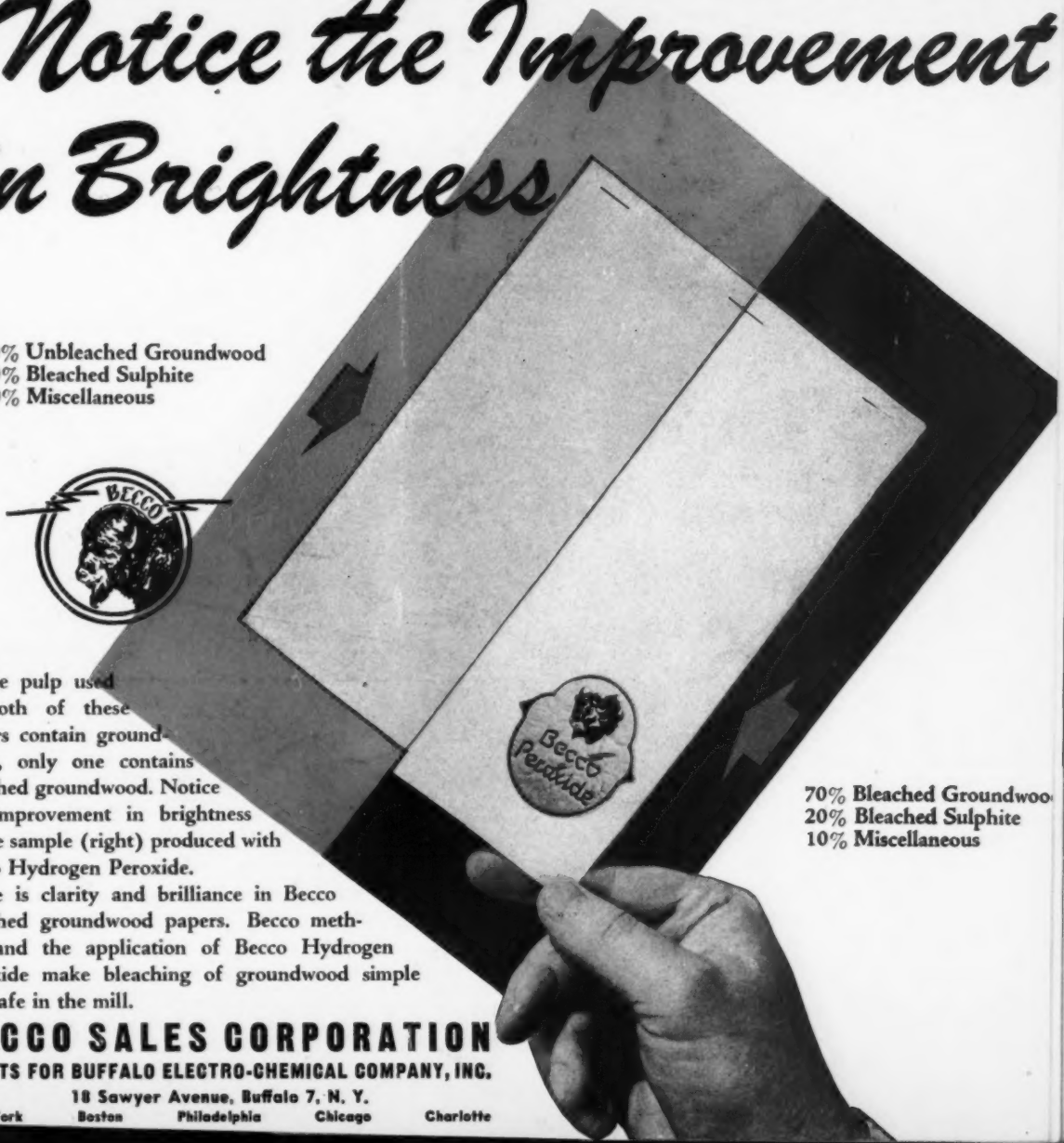
REG. U. S. PAT. OFF.

VOLUME 125, No. 2 JULY 10, 1947

Notice the Improvement in Brightness

70% Unbleached Groundwood
20% Bleached Sulphite
10% Miscellaneous

BECCO



70% Bleached Groundwood
20% Bleached Sulphite
10% Miscellaneous

The pulp used in both of these papers contain groundwood, only one contains bleached groundwood. Notice the improvement in brightness of the sample (right) produced with Becco Hydrogen Peroxide.

There is clarity and brilliance in Becco bleached groundwood papers. Becco methods and the application of Becco Hydrogen Peroxide make bleaching of groundwood simple and safe in the mill.

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DELIVERIES FASTER TODAY—Immediately after the war, we did not have all these increased facilities or parts stock. Our 35 wartime sub-contractors, who were not experienced with paper machinery parts, are now producing under our supervision. Now, deliveries are faster than "even we" thought would be possible a few months ago. . . . . Write! Wire! Phone!

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CALENDAR OF COMING EVENTS

September 3-6, 1947—TAPPI Fundamental Research Meeting, Appleton, Wis.

September 24-27, 1947—TAPPI Acid Pulping Meeting, Minneapolis, Minn.

October 9-11, 1947—TAPPI Alkaline Pulping and Chemical Products Meeting, Asheville, N. C.

October 27-29, 1947—The National Paper Trade Association of the U. S., Inc., Semi-annual Convention, Hotel Sherman, Chicago.

November 3-5, 1947—TAPPI Second Engineering Conference, Philadelphia, Pa.

May 18-20, 1948—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Roosevelt Hotel, New Orleans, La.

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Paper TRADE JOURNAL
REG. U. S. PAT. OFF.
VOL. 125, NO. 2 JULY 10, 1947

Buying Slowdown Hits Midwest Waste Trade

CHICAGO—A slowdown in mill buying of waste paper and another report of slight cuts because of the slowdown, featured the news of the waste materials market during the past week. Waste paper prices were quoted as unchanged as the week began but by the end of the week they were characterized as "largely nominal." Mills were preparing for annual shutdowns for vacations and inventory, and were reportedly trying to avoid making new purchases until they reopen. Trade sources therefore expected little activity in the wastepaper trade for the next month.

The shutdowns had their obvious effect on waste paper dealers who tried to reduce accumulations by closing on Friday and Saturday of last week and the same two days this week. Also noticeable was a reported small amount of distress selling of old news at prices said to be as much as $2 below the mills' quoted price of $20 a ton. Mill prices on other grades held nominally at $16 for No. 1 mixed and $30 for No. 1 old corrugated.

Menasha Mills Close For Vacation Period

MENASHA, WIS.—Among mills closed last week to give their employes a vacation were those of the Gilbert Paper Company, Edgewater Paper Company, Central Paper Company, all in Menasha, and the Neenah Paper Company, Bergstrom Paper Company, Neenah Foundry and Atlas Tag Company, all of Neenah. The George A. Whiting Paper Company closed July 3 and will not reopen until Monday, July 14.

Closing Thursday for the long weekend were mills of Marathon Corporation, Kimberly-Clark's various mills, the John Strange Paper Company, and the Yankee Paper and Specialty Company.

At Kaukauna, Thilmany Pulp and Paper Company's pulp and paper mills closed for a week, resuming operations July 7. The entire Badger Tissue plant also was down for a week.

Suggests Share of Profits To Train Future Engineers

ST. ANDREWS, N. B.—In an address to the technical section of the Canadian Pulp and Paper Association here this week, Dr. Milton F. Gregg, president of the University of New Brunswick, expressed conviction that more inspired and inspiring instructors are needed in Canadian universities.

He said small universities should have help beyond their present resources in sponsoring the post-graduate preparation of able young people who have proved their worth.

He suggested that the industry could set up something in the nature of a permanent liaison advisory committee to confer with appropriate education authorities and explore all the relevant matters affecting the training and development of future engineers.

Tinker Seeks Tax Allowance For Costs of Tree Planting

WASHINGTON, D. C.—E. W. Tinker, representing the American Paper and Pulp Association, last week presented a plea before the House Ways and Means Committee seeking a revision of Treasury Rulings on accounting for the costs of tree planting projects. Mr. Tinker's argument urged that such expense be made deductible in the new tax measure which the committee now is preparing. Under present Treasury Department rulings the cost of setting out new forests is set up as a capital investment. Said Mr. Tinker:

The fact that wood is a renewable natural resource and a public necessity has been recognized by the Congress and by the States through specific steps that have resulted in concrete action.

1. Under the provisions of the Clarke-McNary Act, a vast national system of forest fire protection has been developed in cooperation with the States. While this system is steadily being perfected, the pattern has been formed and in many States has already reached a high degree of satisfactoriness in the form of results.

2. Congress has recognized the need for forest research and federally owned and operated forest experiment stations have been established in all forest regions to develop scientific knowledge and factual data in the growing and utilization of wood.

3. In cooperation with State agencies, the Forest Service and the Extension Service of the Department of Agriculture have developed an educational program directed particularly at farm forest lands to bring about appreciation of the opportunities in wood production.

4. Over the years a vast system of national forests has been established either by the setting aside of public lands suited for the purpose or by direct purchase. These lands are under the administration of the United States Forest Service and are dedicated to maximum production in the interest of the greatest good to the greatest number of people. Likewise, a growing system of State forest projects has been initiated and is rapidly being developed.

5. Also for a period of years the Federal government and many of the States have encouraged timberland

(Continued on page 28)

Wage Rise Presses Payroll Offices

HOLYOKE, Mass.—Pressure is on in the payroll departments of the local paper mills following signing of a new labor contract between management and Holyoke's two principal paper mill labor unions.

Payroll departments have to prepare payrolls covering the ten-cent hourly wage increase, retroactive to June 1, while some of them are also faced with extra vacation payrolls on top of their normal work.

The contract, which besides the pay raise, provides a sickness and accident insurance plan and revised schedules of paid vacations, was signed at the office of Harold T. Martin, labor relations adviser to the manufacturers.

Signatories for the manufacturers were Henry V. Burgee, vice-president of Parsons Paper Co.; Robert Swaney, vice-president of Franklin Paper Co.; E. C. Tucker, president of Chemical Paper Manufacturing Co., and vice-president of Crooker-McElwain Co.; Norman MacDowell, treasurer of Carew Mfg. Co., and E. C. Reid, vice-president, and Peter Freedman, comptroller, of the American Writing Paper Corp. Edward M. Moore, organizer for the International Brotherhood of Papermakers, AFL, headed the union signatories, who included President Robert Cameron, William McFadden, Andrew Beaton, and Edward Zakrewski of Eagles Lodge, No. 1; and President Fred Knowles, John A. Houlihan and William Hogg of Local 226.

Champion Changes In Sales Department

HAMILTON, Ohio — Appointment of H. W. Suter to the position of director of sales, and Herbert W. Suter, Jr., as general sales manager, and Harold E. Wright, assistant general sales manager, were made known this week by Reuben B. Robertson, president of The Champion Paper and Fibre Company. Appointments were effective July 1.

H. W. Suter, vice-president and general sales manager through the past 16 years, has been with Champion since 1911. In his years of association with the company in the sales department he has contributed greatly to Champion's rise to a position of commanding importance in the industry.

Herbert W. Suter, Jr., assumes his new position with a background of broad experience in the paper business. He began his experience with the A. W. Pohlman Paper Company of New York City; next was with the Standard Paper Company of Cincinnati. He then became associated with Champion as assistant manager of the company's Cleveland sales office. After service in the Army Air forces, he returned to Champion as manager of the Cleveland office, and it was under his direction that this office recently was moved to Detroit.

Harold E. Wright has been with Champion since 1935, coming to the company from Kimberly-Clark Corporation, Neenah, Wisconsin. After three years at the Champion Canton, North Carolina, division, Mr. Wright came to the Hamilton division in production scheduling and planning work. During the war he served in the War Production Board, assisting in allocation of pulp and paper for war use. He then returned to the company general office in a sales capacity.

Smith and West Head Appleton Rotary Club

APPLETON—Leonard E. Smith, manager of the Interlake Division of Consolidated Water Power and Paper Company, was installed as president of the Appleton Rotary Club on July 1. Smith recently returned from San Francisco where he attended the annual convention of Rotary International.

The new vice-president is Clarence J. West, editor of The Institute of Paper Chemistry and well known in the paper industry as the compiler of the Bibliography of pulp and paper manufacture.

Diamond Match Names Sickman As Manager

SPRINGFIELD, Mass.—C. H. Sickman, who has been with the Springfield plant of Diamond Match Company for 13 years, and more recently as acting manager, has been named manager by W. O. Augustine, vice-president and general production manager.

HERBERT W. SUTER, JR.
Named Champion's General Sales Manager

Mr. Sickman, a native of Buffalo, N. Y., joined the Diamond Match Company in 1914, working at the Oswego (N.Y.) plant. He later worked at the Chico (Ca.) plant of Diamond Match, prior to coming to Springfield in 1934.

St. Regis Names La Fave Manager at Watertown

WATERTOWN, N. Y.—Francis G. La Fave has been appointed manager of the St. Regis Paper Company's multiwall paper bag plant, according to Willard E. Hahn, manager of bag production. Mr. La Fave was night superintendent of the bag plant for approximately a year prior to his promotion to manager. In his new capacity, he replaces Budd E. Simonton, who recently became bag plant manager at Oswego.

Mr. La Fave joined St. Regis in 1935 in the bag printing division at the Watertown plant. He has been affiliated with that plant ever since.

Tissue Mills Promote Brown and Grasselt

HOLYOKE, Mass.—Charles B. Brown has been appointed purchasing agent of American Tissue Mills effective July 1, 1947. Herman M. Grasselt assumes the duties as assistant to the president and as manager of the company's paper mills at South Hadley, Mass. The status of the paper mill superintendents will not be affected in any way whatsoever.

Mr. Brown, who formerly was connected with the company for many years, returned several months ago as special representative. Mr. Grasselt has been with the American Tissue Mills for several years. Prior to his affiliation with this company, he held executive positions in leading paper mills. He is well-known throughout the trade and paper industry.

Bemis Bag Advances Loomis, Chenault, Duff

ST. LOUIS—C. W. Loomis, manager of the Bemis Bro. Bag Company Memphis plant since 1931, has been transferred to St. Louis where he will assume important administrative duties.

F. C. Chenault, Bemis sales manager at Memphis, succeeds Mr. Loomis as manager of the Memphis plant. He assumed his new duties on July 1. Mr. Chenault, a native of Tennessee, is widely known throughout the southern flour and feed industries and has been with the company for over 30 years.

R. R. Duff, now in the market research department in the Bemis company's general offices in St. Louis, succeeds Mr. Chenault as sales manager at the Memphis plant. Mr. Duff has been a member of the Bemis organization since 1932. During the war years he was on leave from the company and served in Washington in the War Foods Administration and in other governmental agencies.

United Wallpaper Promotes Ream and Seguine

CHICAGO — E. W. Ream and J. E. Seguine were appointed as vice-presidents of United Wallpaper, Inc., this week by William H. Yates, president. Both men have been active in the wallpaper industry for twenty years.

Ream, who joined United in 1937, has most recently been in charge of sales for the company's western division. Seguine has been director of sales for the eastern division since 1945.

Mrs. Rosin Returns Home After French Lick Fall

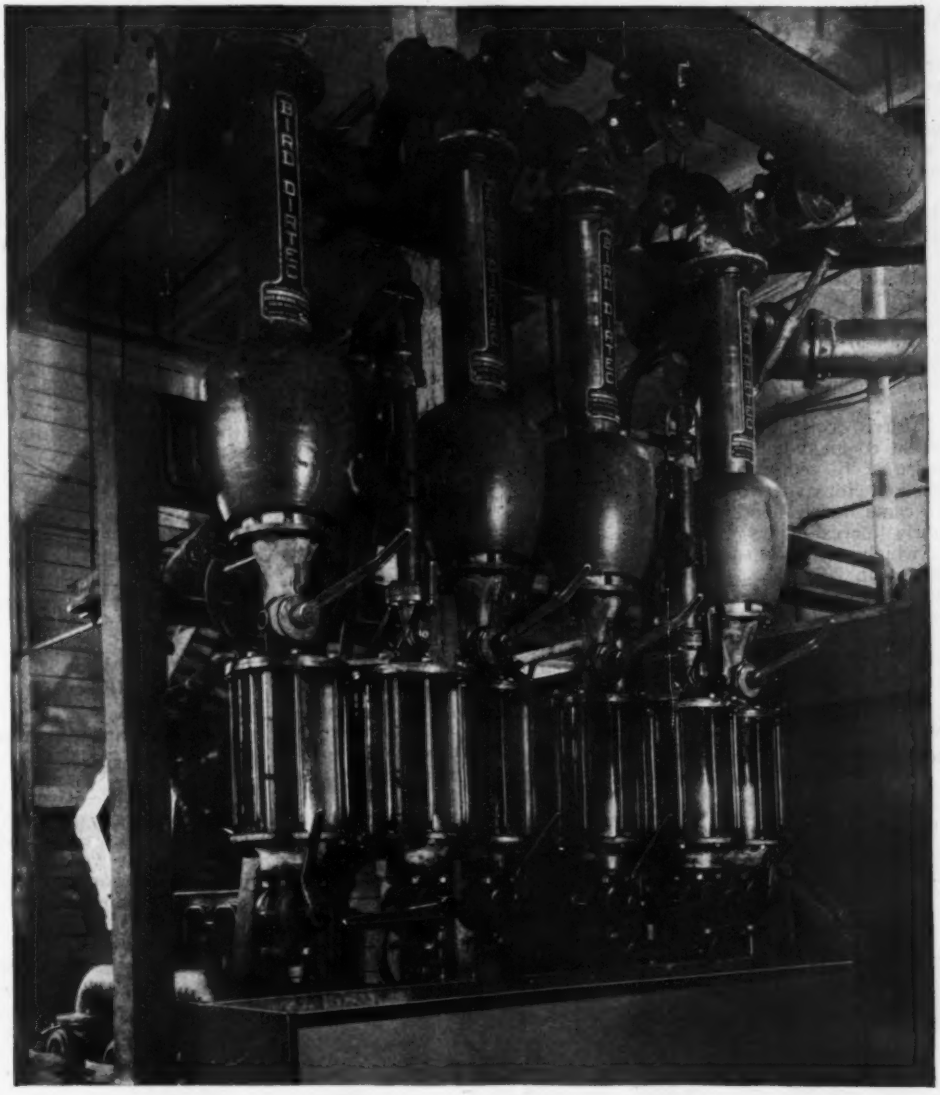
READING, Ohio — Friends of Mrs. Harry Rosin welcomed her home last week after her discharge from the hospital to which she had been removed at French Lick, Ind., where she had fallen from a horse. Her accident had occurred on the first day of her visit to the resort during the convention of the Paper and Twine Association, where she had gone with her husband who is vice-president and general sales manager of Loroco Industries. Others in the party were Mr. and Mrs. Arthur Rosin, Mr. and Mrs. Sidney Grant, of this city, and Carl Leeds of New York City.

Kist Directs Traffic For Perkins-Goodwin

NEW YORK—Among promotions and new duty assignments of duties in the Perkins - Goodwin Company organization reported last week in these pages the duties of Richard F. Kist were confused with those of another branch of the business. Mr. Kist, as the story correctly stated, is the new traffic manager of the company. He succeeds Joseph F. Gill, who has retired.

WHAT A JOB THESE BIRD DIRTECS DO

When It Comes To Getting Dirt Out of Paper Stock



YOU ought to see the slick way these Dirtecs, utilizing simple pressure-drop, whisk dirt away from the clean fibres and detour it neatly and completely out of the system.

Bird Dirtecs are operating with outstanding effectiveness and economy on a wide range of stocks, both ahead of the paper machine and as tailings units for the Bird Screens.

Ask us to show you why the Dirtec is the best dirt remover of its type and how easy and inexpensive it is to put it to work in your mill.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Employes Strike at Brown Company Mill

BERLIN, N. H. — Brown Company's 2800 production and maintenance workers are out on strike in a dispute which a United Mine Workers official said concerned higher wages and paid holidays.

The paper manufacturing company, largest industry in northern New Hampshire, immediately was surrounded by a picket line which a union spokesman said looked as though it included every member of the AFL local.

Another 1200 employes in the company's woods department were not involved.

Philip Smyth, local president, said the union sought a 14 cents an hour wage increase over the present 90 cents hourly standard for a 40-hour week and three paid holidays a year. At present there are no paid holidays, Smyth said.

Edgar E. Morris, company works manager, said the company had offered a wage increase of 13 cents an hour that could be taken either of two ways —as a flat 13 cents hourly boost or a 12 cents hourly increase plus three paid holidays which would be equivalent to another cent.

Morris said the company offer was in accordance with its policy of paying wages equal to those paid by its competitors. The company offer would be retroactive to May 1.

Pay Hike Adds $3 Million To Westvaco Payroll

CHARLESTON, S. C. — Announcement is made of a general wage increase of ten cents an hour granted by the West Virginia Pulp & Paper Company under terms of a one-year contract, effective July 1.

Saskatchewan Increasing Its Sulphate Reservoirs

VANCOUVER, B. C. — Capacity of the sodium sulphate reservoirs of the Saskatchewan government at Chaplin Lake plant are now being enlarged to meet increased demand. Originally geared to produce 50,000 tons of the dehydrated mineral this year, the public enterprise venture which is operated by Saskatchewan Minerals, will be stepped up to produce at least 80,000 tons.

Whether or not the venture will undergo still further expansion this year will depend on the results of a market-sounding trip to be taken by two officials of the crown corporation. D. H. F. Black, a director of Saskatchewan Minerals, and Harry Wilks, in charge of sales for the corporation, were planning to leave at the weekend for conferences in Montreal and New York with pulp and paper executives.

One of the factors bringing about an increased demand for the mineral is that the capacity of the kraft paper industry has undergone a general 75 percent increase in the past few years.

It is understood that present expansion will involve adding to the existing reservoir capacity but if it is found that the government will be assured of a steady, rich market the reservoirs might be increased to four.

Brine will be pumped into the reservoirs in July under warm weather conditions. The salt precipitates from the saturated solution during cold weather. Once the reservoirs have provided their first precipitate the government expects to have a continuous operation on the shores of alkaline Lake Chaplin.

Total sodium sulphate production in Saskatchewan in 1946 aggregated 105,768 tons valued at $1,030,546 compared with the 93,068 tons, valued at $884,322 produced in the preceding year.

Illinois Solons Set Spending Record

The Illinois Legislature adjourned sine die on June 30 after a six months' session which saw the Illinois solons boosting the State appropriations for the next biennium to over a billion dollars, a record amount for the State. Of major interest to the paper trade represented in Illinois or doing business in the State were:

Defeat of a proposed Fair Employment Practices Bill which would have given power of subpoena and enforcement to a Commission to enforce any violations of employment regulations arising through refusal to employ help because of race, color or creed or national origin.

Passage of bills to set a limit on taxation increases by the various local assessing bodies in the State — the limitation to project taxes about 10 to 20 percent higher than a year ago.

Passage of legislation to increase workmen's compensation rates about 10 percent.

Passage of a bill permitting the city of Chicago to levy a ½ cent city sales tax if approved by referendum vote.

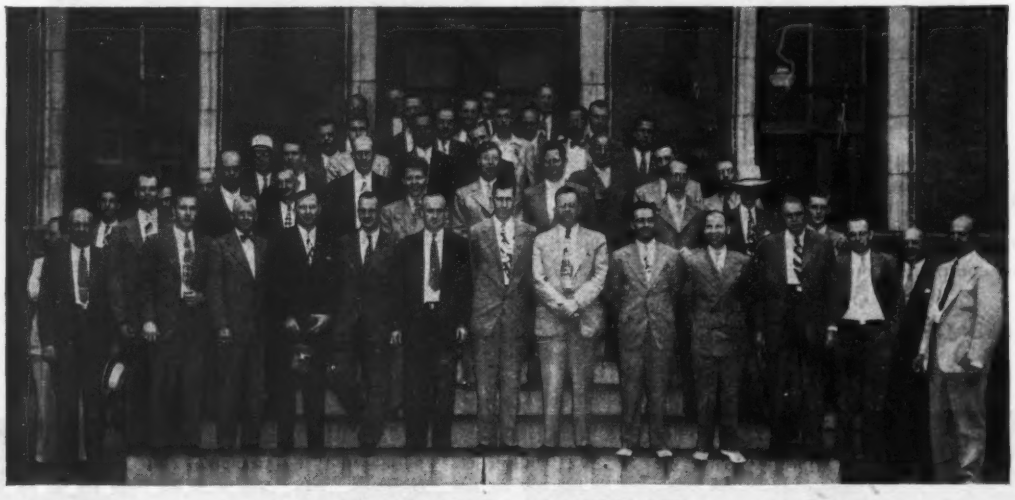
No changes in benefits or rates under unemployment compensation.

No changes in the Illinois Occupation tax rate or procedure except of a technical nature.

Defeat of an Equal Pay for Women bill and of a Wage-Hour proposal for the State of Illinois.

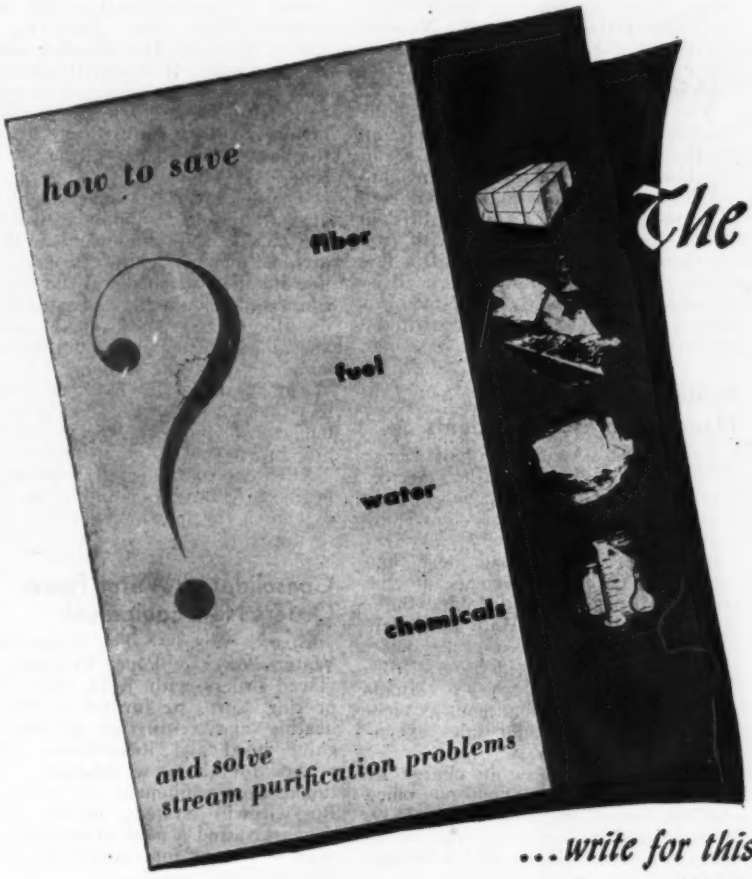
George Schneider Elected To Vice-Presidency

OAKLAND, Cal.—George J. Schneider, general manager of the National Container Company of California, after some fourteen years of service with the company has been elected a vice-president of the company.



PRINTERS LEARN ABOUT PAPER

The P. H. Glatfelter Company played host, June 26, at Spring Grove, Pa., to members of the Baltimore Graphic Arts Association who held their monthly meeting at the Glatfelter mill.



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Meek Tells SAPEYES Of Individual Duty

CHICAGO—J. T. Meek, executive secretary of the Illinois Federation of Retail Associations, was the speaker at the June 30 luncheon of the western division of the Salesmens Association of the Paper Industry, at the Hotel Sherman. The speaker outlined the factors which he concluded led to a record prosperity for this country for the next four years.

Despite some spotty conditions in various lines, Meek stated that the pipe lines in the construction industry for one, and in foreign countries for another, would not be filled before that time. He warned, however, that the people of America must look with most concern on what happens to the government of this country and its economic system "once the chart dips down again as it will inexorably do." He said that the only real salvation for the country was for each individual to have his own plan designed to make him a forceful part of any over-all economic or political plan. He added that "a nation cannot be saved except that the individuals within that nation save themselves" and said that "while the individual cannot make others be more decent competitors he can himself be a better competitor; while an individual cannot make another individual vote, the individual can vote; while the individual cannot make another pray, the individual himself can pray."

Mr. Meek was introduced by Eddie Edwards of the Howard Paper Company, vice-president of the western division. Mr. Edwards announced the second of the golf outings to be held Friday, July 18, at the Briergate Country Club, Deerfield, Illinois. He urged members to participate in the golf "pool" and to make immediate arrangements for the benefit of L. Ranson, golf chairman. Mr. Edwards also announced speakers for the next two weeks, with W. H. Fetridge, vice-president and assistant editor of Popular Mechanics magazine, speaking on July 14 and W. Roy Welch, assistant sales manager of the Marathon Corporation, as the headliner for the July 21 noon meeting at the Hotel Sherman.

L. L. Brown Closes For Vacations

ADAMS, MASS. — Employes of the L. L. Brown Paper Company, with the exception of the office force, are on vacation with the plant closed until July 14. It is the first time the plant has been closed for a two-weeks' period.

Length of employment determined the amount of vacation pay to be given. No vacation pay was given employes at the plant less than the required minimum time, while those who have attained a maximum rating received two weeks' pay.

Kimberly-Clark Girls Train Men at Niagara Falls

NEENAH, WIS.—Girls have been training men to operate machines in one of Kimberly-Clark Corporation's mills, a reversal of wartime procedures. Men will operate 12 machines on the night shift by fall at the Niagara Falls mill, for under New York state labor laws, girls may not work after midnight.

The training of men to operate the machines for Kleenex production began in the spring of 1946, and last fall the last of the interfolders went into production on the midnight shift.

Groundwork for a night shift in Kotex production started with the opening of the Kotex night shift a few weeks ago. Automatic packing will be installed this summer on lines to provide a total of 12 machines with the automatic equipment.

Bulkley, Dunton Pulp Names Two Vice-Presidents

NEW YORK—Appointment of Elmer J. Rose and Milton R. Bailey as vice-presidents of the Bulkley, Dunton Pulp Company has been made known by Fred Enders, president.

Mr. Rose, who has had more than twenty-five years' experience in the pulp and paper mill field, joined Bulkley, Dunton in 1937. With headquarters in the company's New York office, he has been handling accounts from Maine to Florida and west to Michigan. Prior to his appointment as vice-president, he was senior sales executive of the company.

Mr. Bailey has been in charge of Bulkley, Dunton's Kalamazoo office since he joined the company in 1939. Prior to that he was vice-president of the American National Bank of Kalamazoo.

Professional Group Suspends Meetings

CHICAGO — About fifty members of the Chicago Professional Paper Group and their families enjoyed the annual outing of the association held at the Starved Rock State Park on Saturday, June 28. Hot weather and the hundred-mile trip to this Illinois scenic spot cut down the expected attendance considerably but as one member of the arrangements committee put it "those that were there had a gloriously good time."

The delegation ate lunch at the Kaskaskia Hotel in LaSalle and then spent the afternoon in whatever way the individual members chose. Included were five families of members who drove to Starved Rock, took the boat rides on the Illinois river, enjoyed the scenery and hiked. A few played golf but most simply enjoyed the scenery.

The Group will hold no further meetings until its first session in September when officers will be installed and the members, now affiliated with TAPPI as the Chicago Section, will begin the formal monthly meetings extending through the fall, winter and spring season.

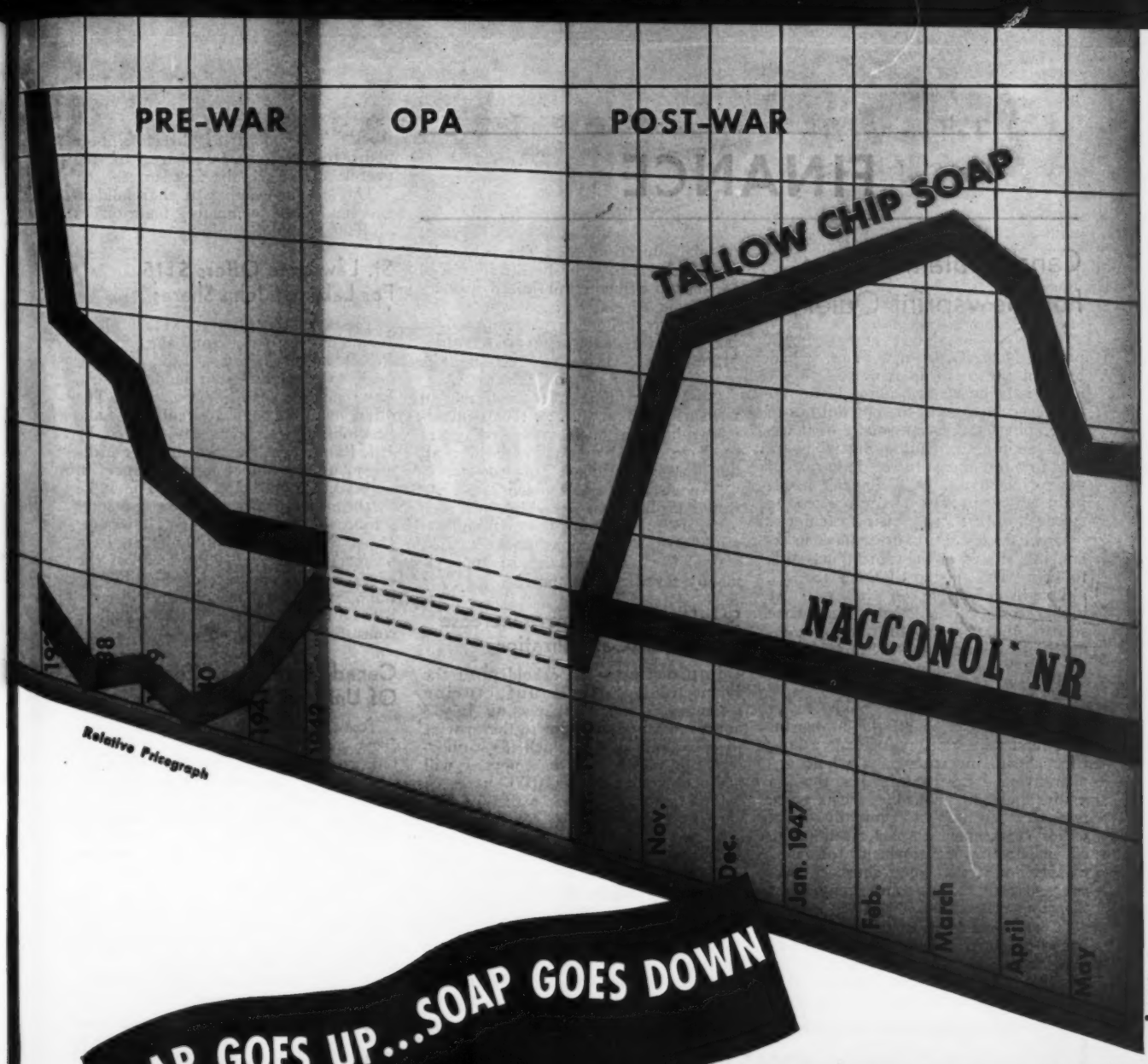
Consolidated Water Power Orders New Equipment

BIRON, WIS. — The Consolidated Water Power & Paper Company has placed orders with J. O. Ross Engineering Corp. to furnish a complete heating and ventilating system, machine hood and Ross-Briner economizers for the new machine. Additional Ross equipment will include a Ross-Grewin System, motor cooling apparatus, and a modern summer ventilation system for cooling the working area in the aisles.

ELMER J. ROSE

MILTON R. BAILEY

Become Vice-Presidents of Bulkley, Dunton Pulp Co.



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FINANCE

Canada Blames Price For Newsprint Quiet

TORONTO—The latest increase in the price of Canadian newsprint, which brought the price up from $84 to $90 a ton, is being blamed, not only for the increased interest in the possibilities of developing an Alaskan source of newsprint supply for United States' users, but for the comparative lethargy of newsprint stocks. Why haven't newsprint share prices shown greater strength with sharply rising earnings?

Greenshields & Co., investment brokers, in a letter on newsprint, has this to say: "The raising of the price . . . although defensible on the score of higher costs and still subnormal price relationship of newsprint to other commodities, was unfortunately timed, and, for that reason alone, created uneasiness.

"Although all evidence points to an assured market for all the newsprint Canadian mills can produce for a long time ahead, investors as a whole appear to have taken alarm lest the $16 a ton added to publishers' costs since last October might eventually force either curtailment in American usage of paper or development of new competition from some source; however obscure such a source may be at the moment.

"Certainly one effect of the increase has been to stimulate agitation at Washington for establishment of a newspaper industry in Alaska, with one million tons a year named as a possible objective . . . . The politically powerful U. S. publishers might well be able to promote subsidized production from Alaska . . . .

"Market judgement, as reflected in the action of newsprint stocks since March, while entitled to respect, it is not to be rated as infallible.

"Competent opinion in the Canadian newsprint industry . . . . seems unanimous that for at least several years to come, world markets will take all the newsprint Canada can produce.

"An Alaskan development . . . . . would probably be more in the order of 200,000 tons a year than one million tons—a small amount when set against annual world consumption of approximately seven million tons."

Stockholders Approve Increase In Pennsalt Capitalization

PHILADELPHIA—Stockholders of the Pennsylvania Salt Manufacturing Company in a special meeting July 3 approved an amendment to the articles of incorporation by which the authorized capital stock of the company will be increased from 1,000,000 shares of capital stock of a par value of $10 each to 1,650,000 shares, to be divided into two classes consisting of 150,000 shares of preferred stock of a par value of $100 each and 1,500,000 shares of common stock of a par value of $10 each. At present there are 750,000 shares of capital stock outstanding.

The new amendment also authorizes the board of directors to issue the additional 750,000 shares of newly authorized common stock or the preferred stock. The board of directors now plans to issue 50,000 shares of the preferred stock as the first series.

The special meeting of shareholders was held in the company's main offices at 1000 Widener Building.

St. Lawrence Offers $115 For Lake St. John Shares

TORONTO—An offer of $115 a share for the common stock of Lake St. John Power and Paper Co., Ltd., is being made to company's shareholders by St. Lawrence Paper Mills Co., Ltd. The offer, made through a circular to Lake St. John shareholders and signed by J. I. Rankin, St. Lawrence Paper Mills president, is subject to acceptance on or before August 15, 1947. The Lake St. John common shares are currently selling at $110 a share. St. Lawrence Paper Mills owns all of Lake St. John preferred stock and 88 percent of the common, so acceptance of this offer by Lake St. John shareholders will give St. Lawrence Paper Mills complete control of the company.

Canada Estimates Effect Of United Kingdom Act

TORONTO — While no immediate effects are in sight, trade experts at Ottawa are studying the United Kingdom's new austerity program with some misgivings. They see in it a possible decline in Canadian exports of newsprint, apples and tobacco to the U. K. Basic foods will not be affected.

The U. K. decision on Canadian tobacco is tied in with the non-discriminatory clause of the British-U. S. loan agreement, by which Britain agreed that cuts in imports from the U. S. would be extended in proportion to imports from other countries.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending July 5, 1947

STOCKS

	High	Low	Last
A. P. W.	3¾	3¾	3¾
Armstrong Cork Co.	45¼	43¼	45
Armstrong Cork Co., pf.	105¾	105	105¾
Celotex Corp.	26⅛	24¾	25⅞
Celotex Corp., pf.	20¾	20⅛	20⅛
Certain-Teed Products Corp.	16¼	15½	16
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	22⅞	22¾	22⅞
Champion Paper & Fibre Co., pf.	105¾	105¾	105¾
Congoleum Nairn Co.	27¾	26⅝	27¾
Container Corp. of America	40¾	39¼	40¾
Container Corp. of America, pf. 4	100⅛	100	100
Crown Zellerbach Co.	29¾	28⅞	29¼
Crown Zellerbach Co., pf. 4.20	103⅝	102	103½
Crown Zellerbach Co., 4 pf. 4	113⅝	112½	112½
Dixie Cup Co.	31¼	29	30⅝
Dixie Cup Co., A	52½	52	52
Flintkote Co.	32⅝	30⅛	32⅝
Flintkote Co., pf.	107½	106½	107½
Robert Gair	7¾	7	7⅝
Robert Gair, pf.	19¾	19½	19½
International Paper Co.	49	46⅝	48⅞
International Paper Co., pf.	104½	104⅛	104½
Johns-Manville Corp.	44¾	42⅝	44
Johns-Manville Corp., pf.	121	120½	121
Kimberly-Clark Corp.	24¼	23¾	24¼
Kimberly-Clark Corp., pf.	108	106¾	107¾
Mac Andrews & Forbes	36	36	36
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	25½	24⅝	25½
Mead Corp.	19	18⅞	19
Mead Corp., pf. 4¼	99½	94	99½
Mead Corp., pf. 2	46	45	46
National Container Corp.	40¼	38¼	40⅛
Paraffine Companies, Inc.	70	68	70
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	22½	21¾	22
Rayonier, Inc., pf.	37⅜	37	37
Ruberoid Co.	52	50⅜	52
Scott Paper Co	45	44¾	45
Scott Paper Co., pf.	100	99	100
Sutherland Paper Co.	42	41	41½
Union Bag & Paper Corp.	32½	31⅛	32¼
United Paperboard Co.	14⅛	14	14⅛
U. S. Gypsum Co.	105½	99½	102½
U. S. Gypsum Co., pf.	188	187½	187½
West Virginia Pulp & Paper Co.	40¼	39	39½
West Virginia Pulp & Paper Co., pf.	....	....	....

BONDS

Abitibi Pulp & Paper Co., 5s '53	....	....	....
Celotex Corp., 3¼s '60	....	....	....
Certain-Teed Products Corp., 5½s '53	....	....	....
Champion Paper & Fibre Co., 3s '65	....	....	....
Mead Corp., 3s '66	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending July 5, 1947

STOCKS

	High	Low	Last
Great Northern Paper Co.,	42½	41¼	42
St. Regis Paper Co.	....	....	....
Taggart Corp.	8¾	8¾	8¾

BONDS

American Writing Paper Co., 6s '61	....	....	....

The New VALLEY VORTEX Pulper

A prominent paper mill, considering the purchase of four Valley Vortex Pulpers, wrote the following after witnessing a demonstration and getting first-hand knowledge of the machine's high production capacity:

"We were very favorably impressed with operation of your machine; so much so that we believe three units will handle the production which we had contemplated for four . . . and we are accordingly placing our order for three machines."

We cite this case to emphasize the extraordinary cost-cutting ability of this powerful pulper. Let us show you how the Valley Vortex Pulper can save money for you, too. We'll be glad to have you write us.

VALLEY IRON WORKS Company

Masonite Offers By-Products of Widespread Application

LAUREL, Miss. — Two new types of by-products have been made available by the Masonite Corporation which offer promise of widespread application. One is a water soluble hemicellulose derived from the hydrolysis of wood, while the second is a very fine hydrolyzed lignocellulose fiber considerably enriched in lignin content. Both are now available in quantities at comparatively low cost.

The Masonite Corporation, with its plants at Laurel, Mississippi, produces fiber for its various structural board products by the explosion of wood with steam at pressures up to 1200 pounds per square inch. The acetic and formic acids formed by this high temperature steam treatment of the wood results in an acid hydrolysis and renders water soluble the major portion of the hemicellulose fraction. The explosion reduces a portion of the wood to extremely fine fiber and fiber particles some of which are finer than 200 mesh. The larger part of the soluble hemicellulose and the extreme fines are separated from the fiber which is used in board manufacture and has constituted a waste material of considerable magnitude.

Research on these waste materials has been carried on over a period of years and has now resulted in the installation of by-product recovery equipment. These two by-products are now available in commercial quantities and are finding important applications.

This material has several characteristics which offer promise of further important commercial applications, especially in the chemical field. It consists of about 70 percent wood sugars (approximately 35 percent pentosan and 65 percent hexosan), 10 percent modified lignin and some 20 percent of organic resins and gums. The ash content is low and the pH of the water solution is about 4.0. A portion of the material is colloidally dispersed rather than in true solution in the water and a mild hydrolysis with mineral acid will precipitate this dispersed material, giving a clear solution of free hexose and pentose sugars together with certain other organic complexes. This solution can be further clarified and fermented to ethyl alcohol, butyl alcohol, acetone, glycerine and citric acid by various standardized types of fermentation.

A considerable amount of work has been done on the production of furfural from the pentose fraction of this material, and a pilot plant was operated for several years working out the manufacturing variables.

This material as recovered is a good emulsifying agent and stable emulsions can be made with various types of water immiscible materials. It has pronounced foaming characteristics and excellent foam stability. At the present time it is finding applications as a binder in various fields, including powdered coal, foundry cores, water treating chemicals and the like. Because of its low cost and ready availability in large quantities, it is anticipated that many more industrial applications will be found. It is available as a 55 percent concentrate in water, known as Masonex and also as a spray dried powder known as Masonoid which is packed in waterproof multi-wall paper bags.

The extremely fine fiber and fiber particles referred to above are marketed under the registered trademark "Benaloid 1000." The material is hydrolyzed lignocellulose and consists of approximately equal amounts of lignin and partially degraded cellulose. It is readily compatible with nearly all thermoplastic resins and with thermosetting resins of the phenolic, furan, urea and melamine type and its extreme plasticity in combination with such resins considerably reduces the amount of resin required for satisfactory molding. This results in less expensive molding compounds.

This material is marketed as a minus 80 mesh powder, packaged in 50 pound multi-wall waterproof paper bags. It appears to be the cheapest available source for large quantities of very fine, highly lignified hydrolyzed lignocellulose.

Col. Smalley Sails After Month's Visit

BOSTON—Lieut-Col. Edgar Smalley, managing director of Edwin Butterworth & Company, Ltd., paper stock dealers, Manchester, England, who has been in this country since May 23, sailed for Manchester June 20. He was in New York some five days immediately after his arrival, but made his headquarters at the office of E. Butterworth & Company, Inc., here during the remainder of his visit.

Keith Paper Re-elects Slate

TURNERS FALLS, Mass. — At the annual stockholders' and directors' meeting of the Keith Paper Company, Paul E. Hodgdon of Greenfield, was reelected president-treasurer. John W. Smead of Greenfield was reelected vice-president, with W. K. Prutzman, Richard J. Doolin, and T. Richard Probst, reelected assistant treasurers.

Joseph T. Bartleet, E. J. Costigan, Jr., Philip S. and Kenneth S. Dickinson, Hodgdon, Max M. Mason, John M. Max, William Ross, and Smead are directors.

Nepco Supplies Farms With Lime Sludge

NEKOOSA, Wis. — About 24,500 tons of lime sludge a year are made available to farmers of central Wisconsin by the Nekoosa mill of the Nekoosa-Edwards Paper Company. It has been estimated that during the 20 years that Nepco has turned over lime sludge to agriculture, about half a million tons have been produced.

The sludge, formerly dumped into the Wisconsin river, is mixed with enough water to make it fluid and pumped from the sulphate mill, through the Nekoosa dam, to the ponds on the east side of the river. There the water seeps out and leaves the sludge for soil-building purposes. About 60 loads of sludge are hauled out of the pond area daily and carried to farms as far as 30 miles away.

In the kraft cooking process used at the Nekoosa mill, 45 tons of quick lime a day are unloaded from box cars by a new installed vacuum suction pump. The quick lime, in pebbled form, is carried three stories up into a giant hopper. It is released when needed and dumped into a "causticizing" tank to reclaim sodium hydroxide, one of the substances used to remove the lignin from pulp fibers.

Nepco has plans on paper for a process which gets rid of the sludge chemically.

Even Paper Mills Say Too Much Rain

MONTREAL—Canadian pulp and paper companies east of the Rockies are having a tough spring. Like the farmers, pulp and paper men say "too much rain."

Up around Lake Superior and in New Brunswick they are saying more than that as high water and fast running rivers break log booms and let pulpwood logs break loose—some getting out to sea.

Even companies which have not had to contend with broken booms are running into difficulties this year. R. M. Fowler, president of the Canadian Pulp and Paper Association, stated that many mills have nearly reached the bottom of their pulpwood piles and are dependent on the spring log drive for a continued supply of raw material. If wood does not arrive on schedule some temporary curtailment of operation will be unavoidable. Pulpwood men say that the spring drive so far has run about one month behind schedule.

Baltimore Printers Visit Glatfelter Mill

SPRING GROVE, Pa. — With approximately fifty in attendance, the June meeting of the Baltimore Graphics Arts Association was held on June 26th at the Lake Club as guests of the P. H. Glatfelter Company; all present spent a very enjoyable afternoon touring the pulp and paper mill of the company.

IT TAKES GOOD ODOR TO GET THE ORDER

Pleasant product odor is your best salesman, bringing not only initial orders, but repeat sales of many paper products. You, too, can utilize odor appeal as a distinct and subtle selling asset, by the discriminating use of Givaudan's aromatics.

Unpleasant residual odors in such items as gummed or casein-coated papers, asphalt-impregnated papers, carbon, waxed or oiled papers, are quickly, easily and economically overcome with Givaudan's deodorants and reodorants.

With its years of experience in industrial aromatics, Givaudan is excellently equipped to solve your odor control probems. In addition to a line of products especially blended for the paper industry, odorants designed to meet your specific needs can be developed in the Givaudan laboratories.

Our technical staff will gladly help you secure the sales advantages of better odor appeal in your paper. Write today for samples and prices.

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Cooper Interests Buy Norwood Plant

NORTHAMPTON, Mass. — Title to the Norwood Engineering Company plant in Florence has passed to the Waterfalls Paper Mills, which is owned by Abe Cooper, president and chief stockholder of the Bagley and Sewell Company of Watertown, N. Y.

Cooper's son-in-law, Harry Markowitz, was in this city for the passing of the numerous official papers in connection with the transaction and he stated in an interview with newspapermen that definite plans for the running of the Florence plant had not yet been formulated.

He stated that there was a possibility that it may be decided to manufacture some parts of paper-making machinery here because of the fact that the Bagley and Sewell Company has a backlog of orders of this type of machinery which the company has manufactured for years.

Markowitz stated that J. J. Tellington of the Waterfalls concern was with him and would stay in Northampton to direct a small crew of men who will be engaged for the next few weeks in making some repairs to the plant and cleaning up the interior.

The Bagley and Sewall Company official stressed in the interview that he did not want to discuss the possible work to be conducted at the Florence plant at this time because the company policy was not to make statements unless an honest effort could be made to live up to them or carry them out. He stated that several possibilities concerning the plant were being discussed by officials but that a definite decision on the matter would not be forthcoming for at least a couple of weeks.

Passage of title to the Waterfalls concern brings to an end a number of legal matters and unsettled conditions concerning the plant in Florence, which had a nation-wide reputation in its field of manufacture for many years.

Markowitz pointed out that the general over-all policy of the Bagley and Sewell Company tended toward operation of plants taken over. He cited a couple of instances where plants were purchased by the company, placed in top-notch running condition, and then sold to new owners, if it was determined by officers of the concern that they did not want to stay in that particular field. He stated that on other occasions the Bagley and Sewell Company has taken over plants which were not making money, streamlined production, put the plants on a paying basis and are continuing to operate them.

Neenah Foundry Doubles Output Capacity

NEENAH, Wis. — A $150,000 underground mechanization unit for molding of iron casting was completed last week-end at the Neenah Foundry. It will permit doubling of the company output without the addition of a new building.

Engineers on the modernization program are from A. A. Wicklund, Chicago, while Flour Brothers did the work with a crew of about 50 men working around the clock. Company employes were on vacation last week to permit the installation of the underground project in time for resumption of operations Monday morning, July 7.

The project includes a 90 foot tunnel, 10 feet wide and 10 feet deep and a 35-foot square pit.

Container Corp. Buys O. B. Andrews Control

CHATTANOOGA, Tenn. — In response to the offer of purchase made to the stockholders by Container Corporation of America, over 90 percent of the common stock of the O. B. Andrews Company here has been deposited with the Hamilton National Bank, according to J. V. Spachner, Container Corporation vice-president. The Andrews concern which has engaged in the paperboard carton and container business for almost half a century, has plants located at Chattanooga, Knoxville and Johnson City, Tenn., and in Atlanta. The main office and largest manufacturing operation of the concern is in Chattanooga.

According to Mr. Spachner, checks approximating $2 million have been mailed to the stockholders mentioned above. Container Corporation offered to purchase all, but not less than 75 percent, of the Andrews Company outstanding shares for $55 a share. The offer expired on July 7.

The announcement that over 90 per cent of the stock already had been deposited was the first information released since the offer to purchase was first mailed to the stockholders and the plan made public. The offer was dated June 5.

Brooklyn Polytechnic Repeats Pulp and Paper Course

BROOKLYN, N. Y. — The graduate course "Pulp and Paper Technology" given last year at the Polytechnic Institute of Brooklyn, N. Y., will again be offered during the forthcoming academic year 1947-48. In this course the important processes and methods which are used in the production of pulp and paper will be described and calculations of equipment and processes made. Bleaching and further preparations of pulp and the making of paper will also be studied, as well as the testing of paper and paper materials.

The course is under the direction of Dr. Robert S. Aries, consulting engineer and director of the Northeastern Wood Utilization Council, assisted by a group of industry lecturers.

The course will consist of 30 lectures given on Wednesday evenings from 6 to 8 p.m.

Filer Mill Continues Under New Ownership

GRAND RAPIDS, Mich.—W. S. Goodspeed, president of the American Box Board Company, and H. A. Eggerss, president of Continental Can Company, in reporting last week the purchase and sale of the fixed assets and inventories of the Filer Fibre Company of Manistee,, and the capital stock of its two subsidiaries, the Leahy Timber Company, Ltd., Ft. William, Ont., and Lone Wolf Timber Company, Grand Marais, Minn., by the American Pulp and Paper Company, explained that operation at the plant will continue without interruption. The pulp and paper company is a newly created, wholly owned subsidiary of the American Box Board Company. The Filer Fibre Company was a wholly owned subsidiary of Continental Can Company of New York City.

The output of kraft pulp and paper products of this mill will increase the sales field of the American Box Board Company and a portion of this output will be absorbed by the company's box factories in Grand Rapids and Chicago.

The operations will continue with the present personnel, who have so successfully operated this company for Continental Can Company.

Officers and board of directors of the American Pulp & Paper Company will be the same as those of the American Box Board Company. They are: Chairman of the board, Marcus B. Hall; president, Walter S. Goodspeed; vice-president in charge of sales, J. S. Burns; secretary, Harrison L. Goodspeed; treasurer, R. K. Stolz. Directors: William Beckwith, Lee Wilson Hutchins, Carl J. Riddering, Gordon B. Bonfield, and C. F. Raber.

Hinde & Dauch of Canada To Build New Plant

TORONTO—Hinde & Dauch Paper of Canada is completing plans by its own engineers for a start in September on the building of a 95,000 sq. ft. initial unit new paper box plant at Chatham, Ont., to cost around one million dollars, including the land and equipment. The new plant will require about 110 workers by the summer and fall of 1948. The latest automatic equipment is to be installed in the new plant. Sidney Frohman, Sandusky, Ohio, is the president of the company, while L. F. Winchell, Toronto, is vice-president and general manager.

The parent company of Hinde & Dauch has recently completed nine new box plants in the United States. The Canadian company now operates two paper mills at Toronto and one at Trenton, Ont., as well as box plants at Toronto and Montreal.

The new Canadian plant, like existing Hinde & Dauch box plants, will make corrugated and solid fibre shipping boxes, interior packing materials and box specialties.

Protect coating compositions during shutdown periods...

Use Du Pont LIGNASAN-X

REG. U. S. PAT. OFF.

The preferred bactericide and fungicide for preserving coating compositions and controlling slime

Here's a sure way to protect vulnerable coating compositions from attack by bacteria and fungi during any shutdown periods. By treating with "Lignasan"-X all the coating stock as soon as it is made up, you can be assured of adequate protection whether the shutdowns last a few hours or several days. "Lignasan"-X also has many other uses in pulp and paper mills.

Added to papermaker's alum, it inhibits the growth of slime in the pipes carrying the alum. Added at the beater, "Lignasan"-X keeps the system clean —all the way to the dryers. Sprayed on laps at the wet machine in pulp mills, it offers protection against deterioration from bacteria and fungi. It also is effective in preserving slush pulp in stock chests.

Find out now how "Lignasan"-X can be of valuable service to you in your pulp or paper mill. Ask your Du Pont representative, or write direct.

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E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware

Pennsalt Opens Oregon Plant After 20 Years of Planning

PORTLAND, Ore. — With the opening June 21 of the new chlorine, caustic soda and DDT plant of the Pennsylvania Salt Manufacturing Company of Washington at Portland, Oregon, production of these two chemicals by the Pacific Northwest operation reached 200 tons a day.

The new, modern plant, built beside Pennsalt's chlorate plant, is the latest result of a 20-year project of this old chemical company to expand with the growth of industry in the Northwestern area — a dream which was first translated into action in 1927 when two Pennsalt officials began the company's operations at Tacoma, Washington.

Present at the opening ceremonies were these two men, who along with Fred C. Shaneman, president of Pennsalt of Washington, took part in putting the new plant in operation. They are Y. F. Hardcastle, vice-president in charge of manufacturing of Pennsalt, and N. Emory Bartlett, former vice-president of Pennsalt and now retired.

The opening of the new plant, the largest expansion project completed by the company in recent years, followed closely on Pennsalt's announcement this summer that it will, for the first time since 1912, seek outside capital of $5,000,000 by the sale of preferred stock for use in a general expansion program of $7,500,000. This financing plan, if approved by stockholders at a special meeting July 3, will mark the first time this 97-year-old chemical company has raised funds by any other means than the sale of capital or common stock.

The new electrolytic plant, said Mr. Shaneman, brings Pennsalt's chlorine and caustic soda capacity to its highest peak in the Northwestern area and places the company in the leadership in production of these basic chemicals in this growing industrial district.

The new operation is the first plant for the manufacture of chlorine and caustic soda in the Columbia River district and one of the pioneer producers of basic chemicals in the state of Oregon.

The bulk of the new plant's production will supply mills of the vast pulp

BARTLETT STARTS PENNSALT MACHINERY

N. Emory Bartlett, retired vice-president of the Pennsylvania Salt Manufacturing Company, threw the switch which put in operation the Pennsalt's new chlorine and caustic soda plant at Portland, Ore., June 21. On hand with him were (left to right) L. M. Shaneman, district sales manager; Fred C. Shaneman, president, Pennsalt of Washington; Y. F. Hardcastle, vice-president in charge of manufacturing; and Glen E. More, superintendent of the new plant. Mr. Bartlett and Mr. Hardcastle made the original survey which resulted in Pennsalt's forming the west coast subsidiary 20 years ago.

AIR VIEW OF NEW PENNSALT PLANT

This view shows the new construction of the Pennsylvania Salt Manufacturing Company of Washington at Portland, Ore. The chlorate plant, office and warehouse, completed in 1942, comprises the saw-tooth-roofed buildings at the right. The rest is new construction. The new construction is: Left, front to rear—Rectifier room (small, square building). Cell room (one story, saw tooth roof). Evaporator room (three-story, attached to cell room). Liquefaction building (two-story, saw tooth roof). DDT building. Center, front to rear — Contractor's office (Quonsets). Drum shop. Liquid caustic soda tanks. Expanded docking facilities. The brine storage tanks and salt pad are at the right rear.

Sutherland

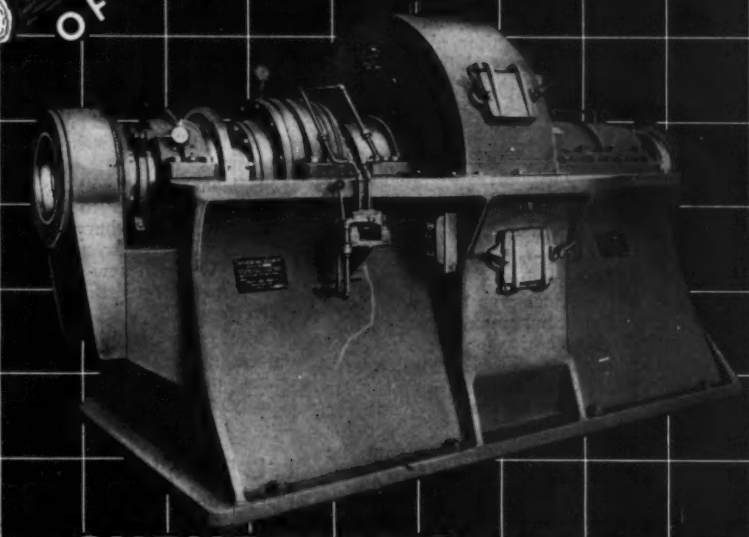
HIGH YIELD

SULPHATE PROCESS

MORE PULP PER POUND OF WOOD

MORE PULP PER POUND OF WOOD

MORE PULP PER POUND OF W



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BEATING AND REFINING SYSTEM

SUTHERLAND REFINER CORPORATION

TRENTON, NEW JERSEY • *Manufactured in the United States by Valley Iron Works Co., Appleton, Wis.*

SUTHERLAND REFINER LIMITED, 319 DRUMMOND BLDG., MONTREAL, P.Q., Manufactured in Canada By The John Bertram & Sons Co. Ltd., Dundas, Ontario

and paper industry, such as those of the Crown-Zellerbach Paper Company, the Pulp Division of the Weyerhauser Timber Company and the Longview Fiber Company and other industries and agriculture in the Columbia River area and in 11 western states.

Chlorine will be supplied, in addition to pulp and paper mills, to municipalities for water purification, for flour mills and other industrial users.

Caustic soda will be supplied for such uses as refining pulp, making rosin size for paper, adhesives for plywood, and wood treating, and also for soap manufacture, oil refining and food processing. Hydrogen, which is also produced in the same process with chlorine and caustic soda, will be available for hydrogenation purposes.

An unusual feature of the new plant is that all of the chlorine and caustic soda production, with the exception of chlorine liquefaction, is under one roof. Power for the electrolytic process is provided by Bonneville Dam at 13,800 volts. The new units bring the power load at Pennsalt's Portland operation to upwards of 10,000 KW. The current is changed from AC to DC by General Electric mercury arc rectifiers, the first used by Pennsalt in electrolytic production of chlorine and caustic soda.

The cell room utilizes improved Gibbs type electrolytic cells, developed over many years of use by Pennsalt. Caustic liquor is evaporated in Zaremba multiple-effect equipment. Nash compressors and freon refrigeration equipment are used in chlorine liquefaction. Another unusual feature of this plant is the employment of Sharples centrifuging equipment for separation of salt from cell liquor — the first such use by Pennsalt in caustic soda production.

Other additions under this expansion program, which includes several projects at the Tacoma plant, include at Portland a new drum shop, new caustic storage tanks and additional boilers.

The new chlorine and caustic soda plant was designed by engineers of Pennsalt after five years of study. When the project was originally conceived, Mr. Shaneman reported, he called in the entire engineering and chemical staff of the west coast operation and asked them to submit their ideas for the ideal type of plant for this production they would select for this area. The present new plant, he said, is the result of the finally accepted plant developed by this group.

Among those taking part in this designing were Glen E. More, superintendent; Kenneth Earnest, assistant superintendent; Edwin R. Cliffe, construction engineer; John Baker, superintendent of the Tacoma plant; and C. R. Duffy, chemical engineer. Assisting in the design was Errol Karr, technical advisor of Pennsalt of Washington who recently was a member of the American team of chemists who investigated Germany's chemical industry. The Roy T. Earley Company was the builder.

SKF Plans $4 Million On Plant Expansion

PHILADELPHIA — SKF Industries, Inc., has adopted a two-year modernization and expansion program that will find the ball and roller bearing firm spending more than $4 million to equip its two Philadelphia plants with new machinery capable in some instances of operating from two to six times faster than standardized equipment long used in the anti-friction bearing industry.

While the bulk of the expenditures will go for new machinery required in the production of anti-friction bearings, the program, according to Thomas W. Dinlocker, vice-president, is aimed primarily at stepping up production of spherical roller bearings, of which SKF is the nation's largest single manufacturer.

Some of the new machinery already has been installed, still more is being designed and built in cooperation with machine tool builders, and certain types of new equipment required in exclusive SKF processes are being built in the firm's own machine shops, Dinlocker said.

"It is now possible, for example, to cold-form rollers for spherical bearings, a method which entirely eliminates turning operations," Dinlocker said. "The equipment developed for this particular manufacturing operation not only enables us to increase output but also to effect substantial savings in bearing steel."

Additional floor space for increased production of spherical roller bearings, widely used in the rail equipment, steel, paper-making and other industries, is being gained in the Philadelphia plants, Dinlocker said, despite a severe building crisis in the area. The company's metal stamping and cast iron departments will be transferred beginning July 15 to newly-acquired plants at Shippensburg, Pa., and Hornell, N. Y., to clear space in the main plants. The two new plants are scheduled to begin operations late this summer.

Other new machines and tools required by the expansion and modernization program are being installed as rapidly as they become available, he said.

L. L. Brown Hikes Pay For Local 556

ADAMS, Mass. — Signing of a new contract with the L. L. Brown Paper Company has been announced by Local 556, International Brotherhood of Papermakers, official bargaining agent for the employes. Under the terms of the new contract they are to receive a five percent adjustment in pay, plus a ten cents an hour increase, retroactive to May 17 this year with the contract effective as of June 16.

Employes with one year of service with the company are to have one week's vacation with pay, while employes of five years or more will receive two weeks' vacation with pay. Six paid holidays and insurance benefits are included in the contract.

Officers of the union elected recently are: President, Charles Richardson; vice-president, Thadeus Doktor; recording secretary, Alfred Neveu; financial secretary, Miss Ida M. Bourdeau; treasurer, Aime Nadeau.

Sees Connecticut As Source of Pulpwood

NEW HAVEN — Connecticut forests once more may bring wealth to the State. Addressing a meeting of the Northeastern Wood Utilization Council in New Haven, July 12, Dr. Robert Aries, Director of the Council, stated that "more than 60 percent of the state is forested and there are more than two million acres of woodland in the area. Connecticut can produce a million cords of hardwood each year. Some of this may be usable for construction and furniture making, but the bulk is now more suitable for pulp manufacture," he added.

TIMBERLAND OWNERS ORGANIZED

A group of timberland owners of the state have organized to develop suitable methods of removing thinnings and unsalable wood for use by pulp industries.

"With later development and mutual planning by the group, Connwood, Inc., the forests of the state will be revived, producing high-grade lumber in a generation," reports Edgar L. Heermance, secretary of Connwood.

According to Dr. Aries, it is likely that several pulp mills embodying the latest advances in hardwood pulping and producing high-grade book or wrapping paper or chemical pulp for rayon and plastics, may be built.

Interest Rises In Chemical Show

NEW YORK—Widespread interest is reported to have developed in the 21st Exposition of Chemical Industries denoting unusual activity in industrial planning and the projection of new enterprises far into the future. Although the exposition will not be held until December 1 to 6, space reservations already assure the complete occupancy of four floors of Grand Central Palace, New York City.

Two noteworthy factors in the outlook are the increased number of inquiries from prospective exhibitors and the greater number of former exhibitors making applications for more space than heretofore.

The display of processing equipment will be more comprehensive than usual, with many new developments to be disclosed. Raw and fabricated materials, standard mill units, such as valves and piping, shafting pulleys, belts, clutches and couplings, transmissions, conveyors, motors and pumps will be shown.

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Limitamp quickly and easily brings these mad short circuits under control. In less than *one-quarter* cycle, Limitamp's EJ-2 fuses cut off a rise in current from a short, and clear it in one-half cycle—long before the fault current has time to harm the contactor or motor. Your plant's power system needs this prompt handling of fault currents, and you will avoid the risk of costly shutdowns that can result from *one mad short circuit.*

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G-E Limitamp control consists of an air-break contactor (the motor starter), and EJ-2 fuses (the short-circuit device). They are mounted in separate compartments of one, all-steel cabinet. Air-break contactors are specially designed for hard duty. Operating experience has proved that they furnish dependable, long-lived, low-cost service with only routine inspection.

Because they operate in air, they eliminate the problem of handling oil. And tip life of air-break contactors is many times that of comparable oil-immersed tips.

EJ-2 fuses are easy to replace, and they can't wear out. When you install a new fuse, you know your short-circuit protective device is in perfect condition.

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Its 50th Year Closed By Schmidt & Ault

YORK, Pa. — Schmidt & Ault Paper Company, manufacturers of paper board and wrapping papers, observed its Golden Anniversary on July 7. The following year, 1948, will mark the 150th Anniversary of paper making on its present site.

It was in 1798 that Philip J. King erected the original mill for the manufacture of very high grade hand-made note and letter paper. So well were these buildings put together that the original Mansion House, erected on the mill property by Mr. King in 1812, is now used by the Schmidt & Ault Paper Company as its office building.

After Philip J. King's death in 1829, his eldest son, George King, continued the management and operation of the mill, specializing in the manufacture of a grade of letter paper named "Congress," which was sold in large quantities to the United States Government and to many customers in Baltimore, Philadelphia and New York.

In 1860, George King died and the mill was taken over by Alfred D. Jessop of Philadelphia, who was a partner of the Jessop & Moore Paper Company of the same city. Mr. Jessop installed a forty-eight inch cylinder machine, manufacturing an excellent grade of book paper.

After Mr. Jessop's death, a relative was brought to York from Holyoke, Massachusetts, by the name of Jerry Horton, to manage the mill for the Jessop estate. Due to the flood of 1884, Jerry Horton, who was managing the mill, suffered considerable loss to the mill property. Shortly after, Elizabeth Jessop, a relative, sold out to the York Water Company.

It was in 1888 that the York Water Company leased to A. A. Yerkes Wall Paper Company of Philadelphia, the mill, which was then used for the manufacture of wall paper or hanging paper as it was known at that time. This was probably the first manufacture of wall paper in York County. When Mr. Yerkes moved to York, he brought with him Mr. John McCoy, who was instrumental in forming, later on, the York Card & Paper Company, which was later purchased by the United Wall Paper Company, Inc. Mr. Yerkes' business continued until 1892 when it was purchased by the National Wall Paper Company. The National Wall Paper Company operated for about two years when the mill was shut down.

On December 11, 1896, Mr. Frank M. Rudolph of Hoboken, New Jersey, leased the mill from the York Water Company, and installed all new paper making machinery. He manufactured paper until July 7, 1897, when a partnership consisting of Mr. John C. Schmidt and Mr. Robert A. G. Ault and Mr. Rudolph continued operations, with Mr. Schmidt as chairman, Mr. Ault as secretary and treasurer, and Mr. Rudolph as superintendent of the mill. Mr. Rudolph continued as superintendent until October 15, 1898, at which time Mr. Schmidt and Mr. Ault bought out Mr. Rudolph's interest in the mill. The mill at this time was producing about two tons per day.

It was in 1903 that the Schmidt & Ault Paper Company was incorporated by Mr. Schmidt and Mr. Ault, and since then, from time to time, alterations and additions have been made to the present machinery on which 200 tons are produced every twenty-four hours.

Ample facilities for this manufacture are provided by the thirteen acres of land located between the Baltimore Division of the Pennsylvania Railroad and the Codorus Creek, which contains three railroad sidings, and can accommodate approximately eighty freight cars.

There are three machines now operating in this mill. The fourdrinier machines, two in number, have trims of one hundred and fifty-four inches and eighty inches respectively. The third machine is of the cylinder type with five moulds. It has a maximum trim of eighty-two inches. It produces various grades of paperboard either solid, single or double lined.

Schmidt & Ault Paper Company depends entirely upon waste paper for its raw material. Waste paper played a very important role in World War II. Without the help of schools, Boy Scouts, waste material dealers and other organizations, paper mills, which required one hundred percent waste paper as their raw material, could not have prospered during the war period. Waste paper today is still a scarce item, and many cities and small communities are continuing their waste paper drives throughout the summer months.

The present management continues to improve and modernize its facilities, always in an endeavor to meet the requirements of their customers, especially the convertors. The chief line of products include light weight chip and corrugating material for the corrugators and tubing stock and set-up boxboard.

Wisconsin Rapids Credit Union Declares Dividend on Profits

WISCONSIN RAPIDS, Wis.—The board of directors of the Bull's-Eye Credit Union, consisting of employes of the Wisconsin Rapids division of Consolidated Water Power and Paper Company, last week declared a dividend of 2.4 percent for the first six months of this year. A total of $3,617 will be distributed. The credit union was organized in 1932. It has more than 2,000 members and total assets of $381,000, and has made loans totaling more than $1,000,000 since it was organized. Lawrence Villeneuve is president.

Gypsum's Baker Sees Heavy Board Demand

BUFFALO, N. Y.—Melvin H. Baker, president of National Gypsum Company, declared recently that the nation's housing problem is a crisis as vital as the one faced by the nation during World War II. He spoke at the firm's 22nd annual picnic at the Automobile Club.

"As suppliers to the housing market, we must be ready to accept a responsibility for efficient operation as great as that which faced us during the war years," he said. "The housing crisis is of a different nature, but is no less vital to the country than the war crisis precipitated by Pearl Harbor."

Baker was optimistic about industry's future.

"National Gypsum Company starts its second 21 years of activity on the eve of a building boom, in contrast to the disastrous '30's that over-shadowed its beginning," he said. "Tremendous energy and initiative from its employes mushroomed this company from a single plant to a 24-plant industry, despite depression and entrenched competition, in its first 21 years.

"If the same energy and initiative goes into our second 21 years, when the country is launching into a period of unprecedented prosperity, and when we are in a most favorable competitive position, our potential, both for our own and the nation's progress, is immeasurable."

After dinner, 36 employes were welcomed into the company's 20-year club with the customary presentations of gold wrist watches.

Lakeview Supervisors Elect Homblette

NEENAH, Wis. — Arthur Homblette last week was elected president of the Lakeview Supervisors' Club. Others elected were: Roy Collar, vice-president; Paul Kress, secretary; and Warren Sanders, treasurer. Dean Anderson and Walter Steiner are the two new board of control members, the others being the officers and Steve Cvengros, Al Lund and Claude Brady.

Plans are being made for the club's annual picnic.

Marathon Staff Picnics

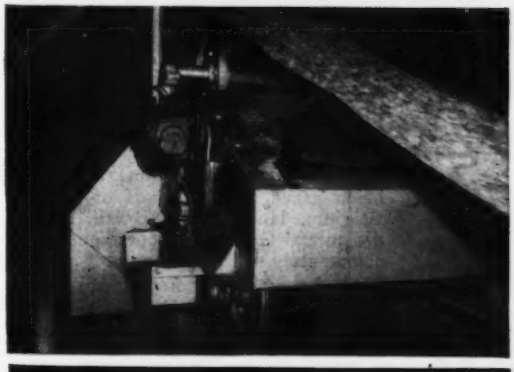
WAUSAU, Wis.—Marathon Corporation employes in the area held their twelfth annual picnic July 4 at Rothschild park. William Palm was general chairman. Sponsored by Paper Makers Local 319, Pulp and Sulphite Workers Local 217 and office employes, features of the picnic included a king and queen contest. Games and contests were held for children and adults during the afternoon, and activities closed with a dance at the pavilion in the evening.

LINK-BELT CONVEYORS

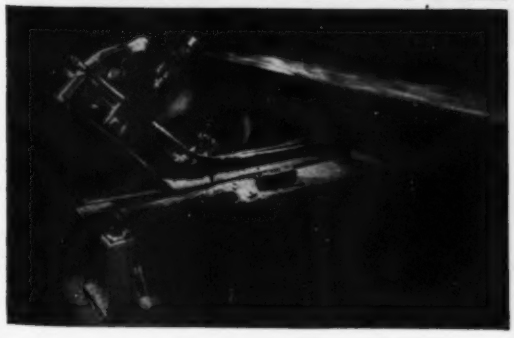
ASSURE EFFICIENT HANDLING AT WEYERHAEUSER

Link-Belt H-124 malleable iron chain conveyors handle the logs to and from hydraulic barker. Link-Belt ➢ FLINT-RIM ➣ sprockets are used on all of these chain conveyors.

A Link-Belt liquid vibrating screen is employed for screening out the fine bark remaining in water discharged from the hydraulic barker.



Link-Belt roller bearing belt conveyors handle chips from whole-log chipper to surge bins over vibrating screens in screen room and from screens to chip storage bins in the mill. Link-Belt ➢ TANK ➣ type trippers are employed for distributing chips throughout surge bin in screen house and the chip storage bin in mill.



Link-Belt Type 100 belt conveyor idlers with 45° end rolls are used. Photo shows Link-Belt self-aligning idler for automatically and positively maintaining long conveyor belt in a central position without injury to its edges.

● Link-Belt conveyors handle logs, chips and bark at the modern hydraulic barking and whole-log chipping plant of the Pulp Division of Weyerhaeuser Timber Company, Longview, Washington.

Link-Belt Company manufactures in its own plants, all types of chains, sprockets and a complete line of belt conveyor equipment and accessories, as well as many other types of conveyors, elevators and mechanical power transmission machinery for every service. Link-Belt's "know-how" accumulated through many years of service to the pulp and paper industry the world over, is available to you.

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AUSTRALIAN NOTES

PERTH, W. Australia—Total imports of newsprint during February last were 13,262 tons, compared with the 14,053 tons of January and the 13,803 tons of the previous February. Imports of other printing papers were: Imitation art, 46 tons (41 from U.K., 5 from Norway); other coated printing paper, 83 tons (48 U.K., 19 Italy, 14 Norway, 2 Canada); glazed imitation parchment, 14 tons (9 Norway, 5 U.K.); other lithographic, machine glazed or one side calendered, 233 tons (228 U.K., 5 Finland); offset embossed, 26 tons (19 Canada, 5 Norway, 2 Sweden); and other printing paper, 491 tons (223 Finland, 138 Norway, 46 Sweden, 42 U. K., 40 Canada, and 2 U. S. A.). All in all a poor showing for U. S. A.

Shortage of paper in all fields is acute. Newspapers continue to find it necessary to refuse advertising, and storekeepers are finding the problem of wrappings one of increasing difficulty. The Federation of Retail Grocers and Storekeepers' Associations of Australia has issued a warning that unless the Federal Government immediately obtains supplies of paper bags, public health will suffer. On top of this comes a statement from the Minister for Trade & Customs (Senator Courtice) that he has authorised importation of paper to cover bag requirements.

Paper Salvage Ltd., a company whose administration is entirely voluntary and whose profits are devoted to the Boy Scouts Association, is making a drive for waste paper in Western Australia. This is being forwarded to mills in South Australia for repulping.

The half-yearly conference of the Australian Newspaper Proprietor's Association was held in Sydney recently, when one of the main subjects discussed was the shortage of newsprint. Increased cost of overseas newsprint, states "Newspaper News," has brought the price in ship's slings in Australia to £39/9/6 ($189.48 at par) a ton, but cartage, etc., puts the paper into store at about 42 pounds ($201.30). Rise since 1942 has been approximately $28.80 per ton. Tasmanian newsprint mills are producing about 28,000 to 30,000 tons a year, the maximum until the costly large-scale development scheme (already outlined in these columns) raises output to 80,000 tons.

United Documentary Films Ltd. has produced an interesting documentary for Australian Newsprint Mills Ltd., entitled "Timber Makes News." This depicts the work from logging in swamp-gum forests to the sale of the paper by the newsboy. Newspaper sequence was shot in the offices of the "Melbourne Herald." Critics have pointed out, however, that one point is omitted from this film—the fact that it took 20 years of untiring research before it could be established that good newsprint could be made from hardwood.

It is estimated that when the new Tasmanian paper mills are completed, sufficient timber can be drawn from the company's concession of some 400 square miles to entirely cover Australia's newsprint requirements for the next 70 years.

Pure Kale Products Ltd. has been registered in South Australia, and the firm has secured extensive mining leases from the South Australian Department of Mines for the development of kaolin deposits. Assays so far carried out show these deposits to be of a higher quality than any yet discovered in Australia, and the report goes so far as to say: "greatly superior to any white clays imported into this country."

Paper manufacturers and merchants are somewhat dissatisfied with the present methods of the Prices Commission, which they class as out of date and far too rigid. At the moment the Commission is employing well over 2,600 persons, and the annual salaries bill is in excess of $4,348,800. While many prices are rigidly fixed, costs are mounting higher and higher. One trade union has recently registered a claim with the Federal Arbitration Court which calls for: A 30-hour 5-day week; a minimum wage of $50 weekly for both males and females; apprenticeship rates ranging from $7 to $32 a week; no overtime unless specified by the union, and then at triple rates; a rest period of 15 minutes twice daily; 28 days annual holidays on full pay; and the usual 12 public holidays. Whether these rates will be granted or not remains to be seen but some indication of the cost of handling materials may be gathered from the fact that Sydney wharf labourers are now earning as much as 28 pounds ($134.40) per week.

The Commonwealth Statistician reports that during the September quarter of last year imports of pulp, paper and stationery from the United States totalled $8,712,000.

OBITUARY

John M. Garvey

CHICAGO — John M. Garvey, retired executive of the Hanchett Paper Company, died on June 28 in St. Joseph's hospital and funeral services were held July 1 in St. Ita's church. Mr. Garvey, 71 years old at the time of his death, had spent a great part of his life in the paper business, having been affiliated with the well known Chicago jobbing firm for many years.

Marathon Recovers Its Wood from the Lake

MENASHA, Wis. — Marathon Corporation has only a negligible loss as the result of recent floods near its Canadian mill on the north shore of Lake Superior, which had swept between 50,000 and 60,000 cords of pulpwood, valued at nearly a million dollars, out into Lake Superior on June 10, it was announced last week by Leo E. Croy, executive vice-president.

On Tuesday night, June 10, all of the booms holding Marathon pulpwood in the Pic river broke loose because of torrential rains, Croy said, but the weather turned favorable the next day and the pulpwood stayed very much in one place until tugs were able to contain it in booms again.

In the salvage operations, two tugs worked together with the boom secured to the stern of each. They swept the surface of the water to round up the logs. In bringing the logs together, 35,000 to 40,000 cords of pulpwood were gathered in one boom, which Croy said he believes was the largest boom of pulpwood ever to be moved on Lake Superior. It was towed by three tugs.

Salvaging operations were completed by the end of the week and the pulpwood was moved to the mill on Sunday, June 14. Only a little pulpwood was left on the beaches and "this can be attributed to the favorable weather during the latter part of the week," Croy said.

South America Asks for More Canadian Newsprint

OTTAWA, Ont.—Strong appeals have been made in Ottawa on behalf of Western Europe and South America for a larger share of Canadian newsprint output in the interests of supporting pro-democratic newspapers, it is learned.

A total of 100,000 tons a year is being asked for on behalf of France, Belgium, Holland and Brazil, out of the annual Canadian production of approximately 4,000,000 tons.

As the practical effect would be to take it out of allocation to U. S. newspapers, the latter are being canvassed for their views. Canadians with investments in Brazil are understood to have added the weight of their influence to the request by that country for more newsprint.

Oxford Ups Pay For 2800

RUMFORD, Me.—A wage boost of 14 to 16 cents an hour has been granted to 2800 employes of the Oxford Paper Company. Field Representative Irving Des Roches of the United Mine Workers of America estimates that the 14 to 16 cents an hour increase would raise hourly pay rates to between $1.07 and $1.09.

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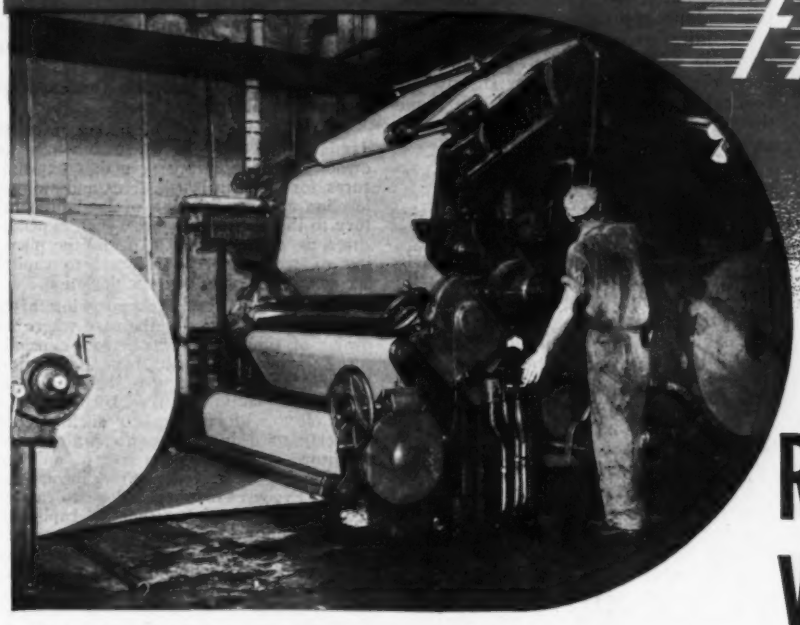

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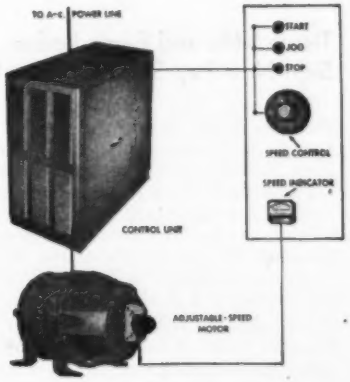

Conveniently-packaged, space-saving V★S Drives are available in Rotating and Electronic Systems or a combination of both systems in sizes from 1 to 200 hp.

Adjustable speed operation from A-c. circuits, through Reliance V★S Drive, offers a greater range of speeds for corrugating units—with s-l-o-w-e-r starting speed, faster top speed. All sections are synchronized. Proper tension is maintained at every point. And operations are simplified through instant, push-button control.

The ability of V★S Drive to increase production while reducing costs is being demonstrated every day on numerous types of equipment throughout the paper industry. That's why it will pay you to have additional information on this *All-electric, Adjustable-speed Drive.* Write for Bulletin 311.

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"Motor-Drive is More Than Power"

Sales Tax Allowance For Tree Planting Costs

(Continued from page 17)

owners to plant trees by producing and furnishing to them forest tree planting stock at or below the cost of production. In addition, the planting of trees in several States has been recognized as falling within the benefit provisions of the Government's Conservation Program for farm lands.

All of the foregoing measures represent direct action and administration on the part of public agencies at public expense. Their justification has been well recognized by the Congress and by the various State Legislatures. However, the vast field of forest land management and production still rests with private ownership. Two-thirds of the forest areas of the United States, including the most productive, remain in the hands of private owners and continue subject to ad valorem taxes.

The forest problem is not static. Better fire protection and changed economic conditions have brought about a change in the viewpoint of most private owners. Under our system of free enterprise, there is every evidence that at the moment the growing of forest crops becomes a reasonably good economic proposition, private owners will seize upon it without hesitation. This has proved to be true in every field of our economic life, and forestry will be no exception.

The Congress and the State Legislatures have a clear-cut choice to make. Our wood requirements must be met. We can either expand through a direct action program of public agencies with tremendous public expense involved, or we can take those steps necessary to permit adequate private forest production where a great deal of progress has already been made. Companies comprising the pulp and paper industry, with which I am particularly familiar, have acquired upwards of fifteen million acres of forest land to be managed permanently for wood production. However, in the management of this land or of any other land similarly owned, the degree of intensity of cultivation and management must necessarily depend upon the economic soundness of the factors considered by private enterprise.

I am recommending for your favorable consideration a corrective amendment to the Internal Revenue Law which, if enacted, would serve to remove the greatest single deterrent to a vast expansion of forest planting programs of private forest land owners. In 1929, the General Counsel of the Bureau of Internal Revenue issued a ruling (G.C.M. 6544, VIII-2 CB 118) that the cost of planting trees in connection with reforestation should be capitalized and cannot be deducted as a current operating expense. As recently as June 20, 1946, this policy was reaffirmed by the Bureau in Mimeograph 6030. Copies of both these rulings are attached.

Obviously, the promotion of a great program of private forest planting at private expense is in the public interest. The policy of the Bureau of Internal Revenue has had the effect of curtailing forest planting by private owners. Nevertheless, the job must be done either by public agencies or by private enterprise. I submit that the tremendous appropriations that would be required to carry on any public program of reforestation will far exceed the insignificant loss, if any, in federal revenue that would result from the allowance of forest planting costs as an item of current expense.

Individual and corporate owners are naturally reluctant to make large investments that will be recognized in their tax picture only in a period of some twenty to one hundred years in the future. This is made particularly true on account of the innumerable risks of destruction by fire, insects and disease in the period intervening between the time of planting and the time of harvesting the wood crop. The present policy of the Bureau in permitting deductions of capitalized costs because of losses does not meet the present situation.

I submit that all expenditures incident to planting, including the cost of planting the trees, should be allowable charges to operating expenses in the year in which the expenditures are made. G.C.M. 6544 cites Article 251 of Regulation 74, which provided in part that in the event a taxpayer who has substantial income from other sources owns timber property which is not yet on a normal production basis, he may charge expenditures for administration, protection and other carrying charges with respect to such property to capital, or treat them as current operating expenses. G.C.M. 6544 lays down the rule that such option to capitalize or treat as a current operating expense does not extend to the cost of planting trees. This ruling and the policy of the Bureau has obviously been one of the great deterring factors in the reforestation program long sponsored by the Forest Service, and other Conservation Agencies both federal and state.

From the standoint of returns to the Federal Treasury, it appears merely a matter of choice as to when revenues would be obtained. The decrease in income tax collected in the years of planting would be offset, and probably much more than offset, by the increase in tax collections in the years when the timber is cut. This is particularly true because no revenue from such sources wil be obtained at all unless vast areas of land are reforested.

The planting of large areas of forest land in the United States is also desirable from the standpoint of national security. During World War II vast quantities of lumber, pulpwood, and other forest products were produced for both direct and indirect war uses and production of these forest products at a satisfactory level proved to be absolutely essential to the successful completion of the war effort. In order to provide forest products on the vast scale needed in modern war effort it is necessary that every encouragement possible be given to the planting and continuous productivity of all of the private forest land in this country.

It is the recommendation of this Association that the Congress amend Section 23 of the Internal Revenue Code by adding at the end thereof a new subsection to read as follows:

"(bb) Optional deduction for expenses incurred in planting of trees.

"(1) Taxable years beginning prior to January 1, 1947.—In the case where an owner of timber property makes expenditures for clearing brush, trees and stumps, leveling and conditioning of land preparatory to the planting of trees, such expenditures, as well as the cost of and the planting of trees shall be charged to capital account recoverable through depletion.

"(2) Taxable years commencing after December 31, 1946.—In the case where an owner of timber property makes expenditures for clearing brush, trees and stumps, leveling and conditioning of land preparatory to the planting of trees, such taxpayer may elect with respect to such timber property to deduct these preparatory expenditures, as well as the cost of and the planting of trees, from gross income as current expenses or charge them to capital account. An election either to capitalize such expenditures or charge them to current expense with respect to a particular timber property shall be made by the taxpayer in the return for the first taxable year in which the taxpayer makes such expenditures, and such election shall be binding on the taxpayer with respect to all similar expenditures made in all succeeding taxable years with respect to such timber property."

It will be noted that it is recommended here that the option to capitalize or charge to current expense the cost of planting timber and the attendant preparatory expenditures be made applicable only to taxable years beginning after December 31, 1946. It is felt that limiting the retroactivity of the new provisions will make it easier to administer, unless permission to change is secured from the Commissioner.

Tissue Mills and Eagle Lodge Sign New Pay Scale Contract

HOLYOKE, Mass.—Representatives of the American Tissue Mills and Eagle Lodge of Papermakers, AFL, No. 1, have signed a new wage agreement.

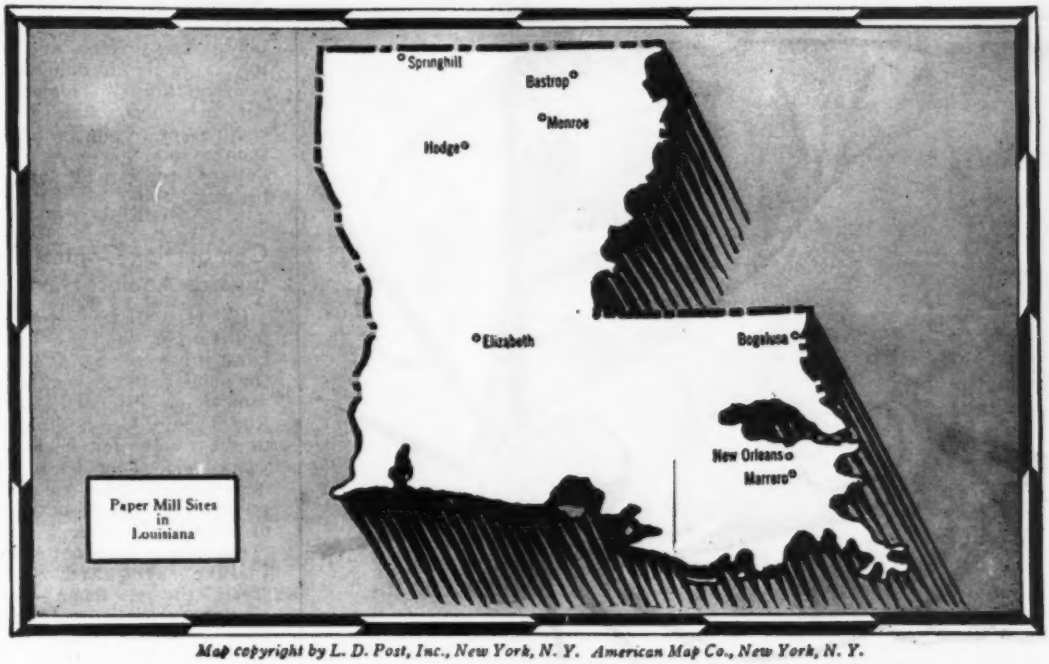
President Benjamin F. Perkins signed for the company. The union officials were International Organizer Edward M. Moore, President Robert Cameron, William McFadden, William Zakrewski and Andrew Beaton.

As agreed earlier the workers will receive a 10 cents hourly increase. They had sought 15 cents. This agreement affects workers at the Stony Brook and Pearl City mills. A checkoff system for dues payment was also agreed to by the company after union officials claimed that it was difficult for workers over the river to get into the city to pay dues.

Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 33 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS



Map copyright by L. D. Post, Inc., New York, N. Y. American Map Co., New York, N. Y.

HIGHLIGHTS: Louisiana, the leading Southern State in the production of paper, now ranks eighth among all the United States in its annual output. The total daily capacity of its eight companies is estimated as over 3,700 tons. With two exceptions they all produce their own pulp. The total annual production exceeds 750,000 tons of paper and paperboard.

In less than twenty-five years production has been increased sixfold. Kraft products predominate, but the specialty mill of the Celotex Corporation with its seven special felting machines produces mineral fibre-board, building board and insulating board, with a capacity for 1,000,000 pounds in 24 hours.

Paper machine equipment of Louisiana includes 18 Fourdriniers, 6 cylinder machines and one Yankee machine. There are eight pulp mills having a daily capacity of 2,918 tons of sulphate and 60 tons of ground wood pulp.

Draper Felts for Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

Canton, Massachusetts

RALPH E. BRIGGS Sales Manager

BRADFORD WEST, PITTSFIELD, MASS. — WILLIAM N. CONNOR, Jr., CANTON, MASS. — L. H. BREYFOGLE, KALAMAZOO, MICH. — WALTER A. SALMONSON, 519-20 WHITE BLDG., SEATTLE, WASH. — L. L. GRIFFITHS, Jr., KALAMAZOO, MICH.

Wilson Manages Plant for Monsanto at Everett

EVERETT, Mass. — James A. Wilson, plant manager for Monsanto Chemical Company at Trenton, Mich., has been named plant manager at Everett effective June 25. Division General Manager Josiah B. Rutter named Wilson to supervise the Everett plant operations which involve more than 800 men.

Rutter also named John S. Hayes, recently Monsanto project manager of the general engineering department's activities at Oak Ridge, Tenn., as division engineer for the Merrimac Division which has headquarters here.

David H. Parshley, an Everett production superintendent, was named assistant to the plant manager. Named as superintendents at Everett were Russell L. Miller, operating superintendent at the company's Monsanto, Ill., plant, and Harold N. Stevens, area supervisor at Everett. George Odom will continue as superintendent.

Wilson is a native of Roanoke, Ala., and was educated at Clemson A. & M. College and the Massachusetts Institute of Technology. He served as assistant plant manager of Monsanto's Carondelet, Mo., plant and as assistant plant manager at Trenton before he was named plant manager in 1944. Wilson will be succeeded at Trenton by Assistant Plant Manager John Eck.

YOU GET UP-TO-THE-MINUTE PAPER DISTRIBUTION WITH W.G.P.

Our sales organization of energetic, alert paper specialists make a combination that's hard to beat. Because of this W.G.P. commands a great volume of business in paper and board products, both domestic and export. Why not put this paper "know how" to work selling your paper products?

W.G.P.

PRINTING, CONVERTING AND INDUSTRIAL PAPERS
TISSUE AND BOARD • LAMP SHADE SPECIALISTS • MUSIC PAPERS
CARBONIZING PAPERS • SPIRAL MILL CORES
MILL SUPPLIES

Saturating Papers for Plastic and Natural or Synthetic Rubber

Eastern Representatives for E. J. Cody Paper Scales and Micrometers
Agents for Ames Pocket Measures

WALKER · GOULARD · PLEHN · CO.

448-450 PEARL ST., NEW YORK 7, N. Y. · WOrth 2-0050

.....EXPORTS TO ALL PARTS OF THE WORLD.....

Monsanto Develops New Surface Finishes

EVERETT, Mass. — Development of a successful line of clear and colored surface finishes for polystyrene plastics has been reported by the Monsanto Chemical Company. Coating chemists and plastic technicians have reported that the lacquers overcome the tendency of solvents to produce crazing in polystyrene. The lacquers are either clear or pigmented, resistant to oil and will protect the polystyrene. They were developed to make possible the coating of the face or the back of the clear moldings in color and to provide wipe-in colors for dials, trademarks and decorations.

The lacquers can be sprayed onto the polystyrene surfaces and will dry rapidly to a hard, adherent and mar-resistant finish of high gloss suitable for an exterior finish. The wipe-on coatings or coatings applied to inlays, such as dial numerals, letterings and designs, are usually applied with a brush.

Combustion Control Device Guards Against Flame Failure

CAMBRIDGE, Mass.—Combustion Control Corporation has introduced the latest Fireye flame failure safeguard for industrial gas oven, kiln, and boiler protection. Fireye Electronic Flame Rod Type 45JQ1 is designed to bring to the combustion field the most advanced electronic design incorporated in several complete combusion control systems—readily applicable to all types of gas-fired burners.

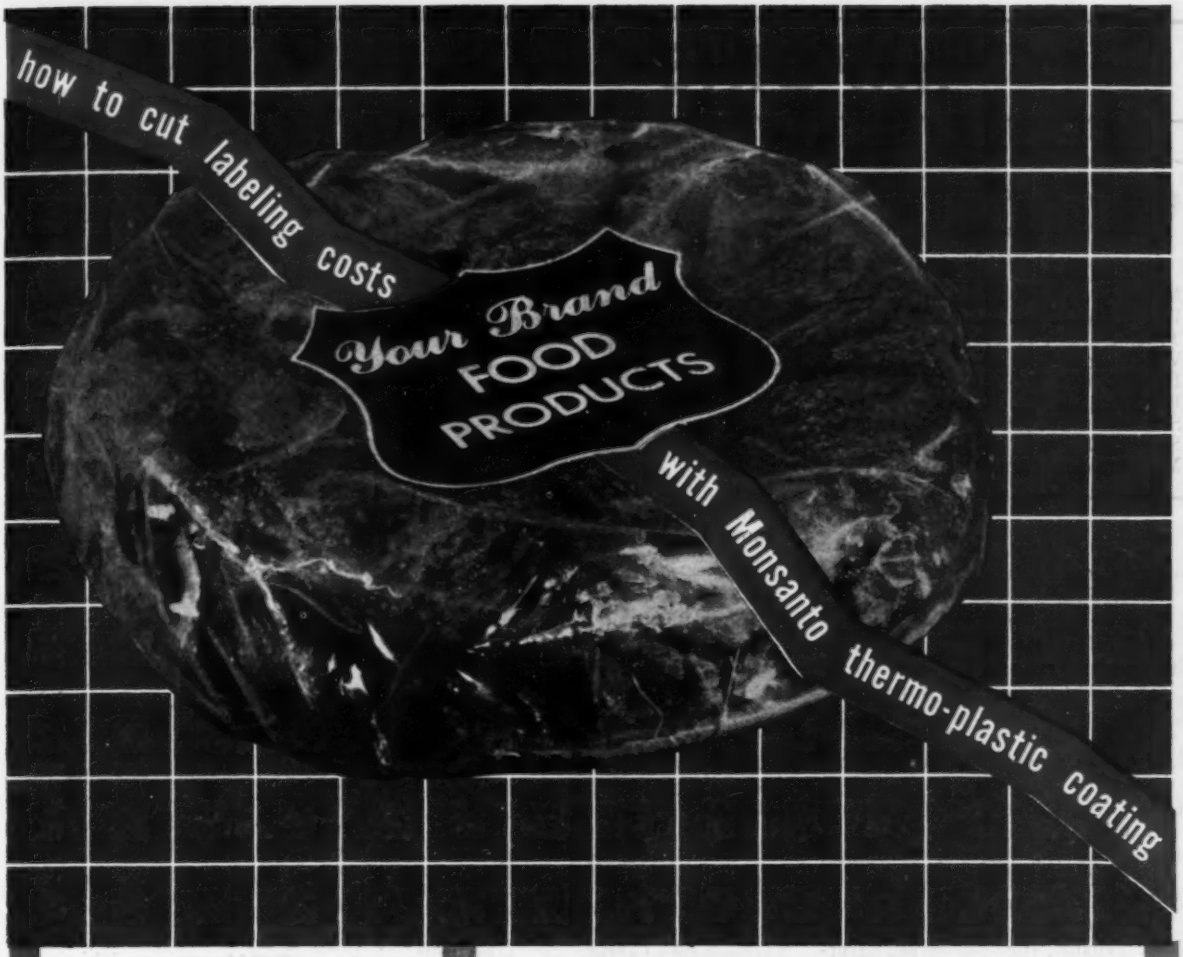
Fireye is a foolproof electronic flame failure safeguard which actually "feels" the gas flame — maintains a constant vigil day and night against the ever-present danger of flame failure. When flame fails, it instantly cuts off fuel and can be wired to sound an alarm automatically. Fireye responds to the flame itself.

Kent Tells Rotary Of Cellulose Products

HOLYOKE, MASS.—C. H. Kent, resident manager of the local plant of the Paper Makers Chemical department of Hercules Powder Co., was the speaker at a recent meeting of the Kiwanis club in Waterville, Me. In connection with his talk, Kent showed a motion picture entitled "Careers for Cellulose," describing the transformation of cotton linters into plastic materials.

Stein Hall Distributes Acryvin

NEW YORK—Stein, Hall & Company, Inc., will be the exclusive distributors for Acryvin products in the textile, paper and adhesives fields. The Acryvin products which include plastic coatings, impregnants and adhesives, are manufactured by Acryvin Corporation of America, Astoria, New York.



Fast, automatic application and reduced inventory costs save you money when you use Monsanto's thermo-plastic coating for heat sealing labels.

This one remarkable plastic coating eliminates extra steps . . . extra machinery . . . extra materials. And you don't have to depend on expensive and unsatisfactory inserts, bands or glued labels when your label is neatly and cleanly applied with Monsanto thermo-plastic coating. But check all these advantages yourself:

1. Faster and more permanent application with automatic machinery.
2. Lower inventory cost with one coating for a wide variety of materials.
3. More economical identification.
4. Cleaner and more sanitary application.
5. Versatility of wrapping with quick change of labels.
6. Easy coding and dating.
7. Saves make-ready time in the labeling operation.

VUE-PAK
TRANSPARENT PACKAGING MATERIAL

MONSANTO
CHEMICALS AND PLASTICS

It will pay you to get all facts about this more economical way to do a better labeling job. See your label supplier or write direct to: MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield 2, Mass.

Vuepak: Reg. U. S. Pat. Off.

SERVING INDUSTRY . . . WHICH SERVES MANKIND

IMPORTS

NEW YORK IMPORTS

WEEK ENDING JULY 5, 1947

SUMMARY

Newsprint...3570 pkgs., 22,404 rolls
Paperhangings ..... 15 bls., 2 cs.
Tracing Cloth ..... 66 cs.
Wrapping Paper ..... 1986 rolls
Printing Paper ..... 168 bls.
Boxboard ..... 430 rolls, 325 bls.
Strawboard....896 rolls, 2000 pkgs.
Sulphite Paper ..... 2081 rolls
Miscellaneous Paper ..... 10 bls.

NEWSPRINT

International Paper Co., International No. 1, Gatineau, 390 rolls.

R. A. Olsen Co., Inc., G.T.D., Donnacona, 376 rolls.

News Syndicate Co., Charles Nordhoff, Baie Comeau, 6645 rolls.

R. A. Olsen Co., Inc., Donpaco, Donnacona, 413 rolls.

N. Y. Times, Empire Caicoa, Botwood, 4178 rolls.

H. G. Craig Co., A.C.D., Donnacona, 395 rolls.

Simon Halpern, Victoria, Constanza, 3570 pkgs.

N. Y. Journal American, Markland, Liverpool, N. S., 532 rolls.

N. Y. Tribune, Inc., Markland, Liverpool, N. S., 1676 rolls.

N. Y. World Telegram, Markland, Liverpool, N. S., 614 rolls.

Brooklyn Eagle, Inc., Markland, Liverpool, N. S., 678 rolls.

Herald Statesman, Inc., Markland, Liverpool, N. S., 41 rolls.

Washington Post (in transit to Alexandria, Va.), Markland, Liverpool, N. S., 2590 rolls.

Alexandria Gazette (in transit to Alexandria, Va.), Markland, Liverpool, N. S., 26 rolls.

Washington Daily News (in transit to Alexandria, Va.), Markland, Liverpool, N. S., 360 rolls.

Sentinel Star (in transit to Alexandria, Va.), Markland, Liverpool, N. S., 83 rolls.

News Syndicate Co., Kay, Thorold, 1734 rolls.

News Syndicate Co., Brian, Thorold, 1673 rolls.

PAPERHANGINGS

W. H. S. Lloyd & Co., American Leader, London, 15 bls., 2 cs.

TRACING CLOTH

Keuffel & Esser Co., George E. Merrick, Manchester, 66 cs. (bleached cotton).

WRAPPING PAPER

E. W. Twitchell, Inc., Samuel R. Aitken, Helsingfors, 467 rolls.

Jay Madden Corp., Samuel R. Aitken, Helsingfors, 1194 rolls.

The Borregaard Co., Inc., Gripsholm, Gothenburg, 56 rolls.

Bulkley Dunton Paper Co., Gripsholm, Gothenburg, 93 rolls.

Metz Paper Co., Gripsholm, Gothenburg, 176 rolls.

PRINTING PAPER

Jay Madden Corp., Samuel R. Aitken, Helsingfors, 13 bls.

Baldwin Paper Co., Gripsholm, Gothenburg, 155 bls.

BOXBOARD

Jay Madden Corp., Samuel R. Aitken, Helsingfors, 430 rolls, 325 bls. (bleached lined folding).

STRAWBOARD

G. H. Buehrman, Inc., Czechoslovakia Victory, Rotterdam, 896 rolls.

Joe Salwen Paper Products Corp., Aalsdyk, Rotterdam, 2000 pkgs.

SULPHITE PAPER

Biddle Purchasing Co., Gripsholm, Gothenburg, 297 rolls (white).

Metropolitan Paper & Bag Corp., Gripsholm, Gothenburg, 1784 rolls (white).

MISCELLANEOUS PAPER

S. Ehrlich, Czechoslovakia Victory, Rotterdam, 10 bls.

RAGS, BAGGINGS, ETC.

Darmstadt Scott & Courtney, Stockholt, Recife, 39 bls. cotton cuttings.

Lush Cotton Products Co., City of Evansville, Cochin, 100 bls. cotton waste.

New England Waste Co., Clydebank, Tuticorin, 121 bls. cotton waste.

Lush Cotton Products Co., Clydebank, Cochin, 100 bls. cotton waste.

OLD ROPE

D. M. Hicks, Inc., Exemplar, Calcutta, 55 bls. (old hemp cuttings).

(———), Exemplar, Calcutta, 40 bls. (cuttings); 450 bls. (old hemp cuttings).

WOODPULP BOARDS

Jay Madden Corp., Samuel R. Aitken, Helsingfors, 279 rolls, 251 bls. (solid white).

National City Bank, Stegeholm, Kotka, 250 bls., 1446 rolls, 440 tons; 1 cs. (sample).

GLUESTOCK, ETC.

Darmstadt Scott & Courtney, Stockholt, Recife, 132 bags, 39 bls. gluestock.

H. Remis, Santa Isabel, Callao, 129 bls. gluestock.

John Gorvers, Cinch Knot, Havana, 30 bls. dry splits, 18 bls. dry hidecuttings.

Trans-atlantic Animal By-Products Corp., Scania, Rio Grande, 1000 bags boneglue.

John Gorvers, Santa Monica, Barranquilla, 688 rolls, gluestock.

PORTLAND IMPORTS

WEEK ENDING JULY 5, 1947

J. Andersen & Co., Rosa Thorden, Munksund, 1302 bls. kraft sulphate pulp.

Cellulose Sales Co., Rosa Thorden, Munksund, 4068 bls. kraft sulphate pulp.

BOSTON IMPORTS

WEEK ENDING JULY 5, 1947

Tradesmans National Bank Trust Co., Rosa Thorden, Munksund, 5040 bls. dry chemical pulp.

Bank of New York Trust Co., Rosa Thorden, Munksund, 3024 bls. dry chemical pulp.

Central Bank Trust Co., Rosa Thorden, Munksund, 7070 bls. dry chemical pulp.

Pulp & Paper Trading Co., Gullmaren, Svano, 1826 bls. strong sulphite pulp.

Perkins Goodwin & Co., Gullmaren, Svano, 3048 bls. strong sulphite pulp.

Cellulose Sales Co., Gullmaren, Svano, 600 bls. sulphate pulp.

Price & Pierce, Ltd., Gullmaren, Wallvik, 1673 bls. sulphite pulp; 3300 bls. dry sulphite pulp; 6000 bls. dry sulphate pulp.

(———), John, Rauma, 1060 bls. extra strong sulphate pulp; 1500 bls. unbleached sulphate pulp; 55 bls. sulphate pulp; 11,839 bls. kraft sulphate pulp; 3258 bls. extra strong sulphite pulp; 2580 bls. strong sulphite pulp.

WILMINGTON IMPORTS

WEEK ENDING JULY 5, 1947

Cellulose Sales Co., Gullmaren, Kramfors, 8400 bls. sulphite pulp.

PHILADELPHIA IMPORTS

WEEK ENDING JULY 5, 1947

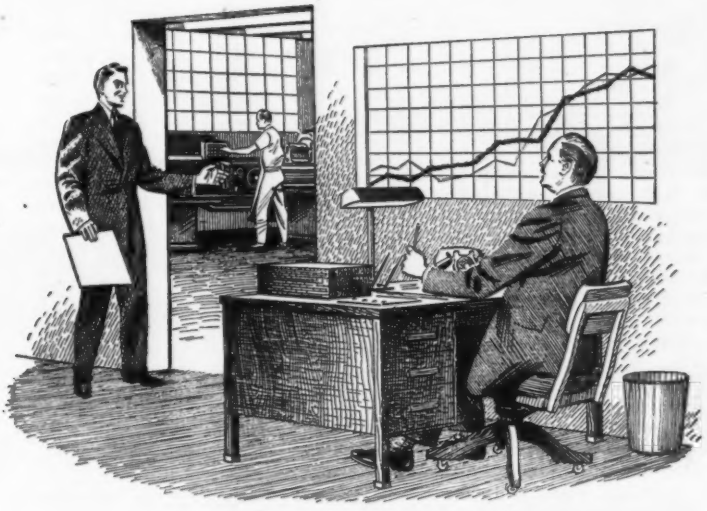
Cellulose Sales Co., Gullmaren, Kramfors, 3130 bls. sulphite pulp.

NORFOLK IMPORTS

WEEK ENDING JULY 5, 1947

E. Butterworth & Co., Inc., Czechoslovakia Victory, Antwerp, 132 bls. old bagging.

Has your plant hidden losses in maintenance costs?



Let a GULF LUBRICATION ENGINEER

help you find opportunities

for dollar savings

DOES AN ANALYSIS of your maintenance costs reveal a large expenditure for the purchase and installation of repair parts? How much of this expense can be traced to excessive wear caused by faulty lubrication?

With Gulf quality lubricants, wear can be so reduced in many types of machinery that operation for years is possible without repairs or part replacements.

Call in a Gulf Lubrication Engineer today and let him assist you in finding opportunities for improved lubrication of your equipment. In his broad experience, he has found literally dozens of ways to save money and increase production efficiency by the better selection and application of oils and greases. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
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GULF INDUSTRIAL LUBRICATION

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, July 9, 1947.

Demand for paper and paperboard continues well ahead of production. Consumers shopping around for lower prices are finding the market as firm as ever. Steady customers are favored with adequate supplies at reasonable prices. On the open market, high "fringe" prices are noted for all grades of paper and board. The paper industry, however, is not without competition. Second-hand textile bag dealers plan an extensive national campaign to promote used cotton and burlap bags, to combat the increased use of paper bags and containers. Meanwhile, paper bag manufacturers have noted some falling off in orders for multi-wall bags, particularly in the building and agricultural markets. Multi-wall bags for export, however, have increased so that the demand for this product remains fairly steady. Demand for paper containers remains heavy enough to force dairymen to alternate between square waxed paper containers and glass containers. Manufacturers of groundwood printing, book and fine papers are producing a wider variety of grades, but the bulk of production is still in the higher grades. This situation is not entirely voluntary, since raw material shortages continue to hamper mill operations of this group. Contract prices for pulp, paper and paperboard are leveling off. Since June 1946 the greatest increase in prices in the pulp and paper industry has occurred in the paperboard segment. This is to be expected as the price of paperboard is largely dependent on the price of waste paper. Because of the great need for waste paper and the responsiveness of supply to price, waste paper prices increased considerably. Currently, waste paper prices have shown signs of easing, and such easing will in time effect paperboard costs.

The ratio of United States production to mill capacity for the week ending June 28, 1947, as reported by the American Paper and Pulp Association was 105.9 percent compared with a revised figure of 106.1 percent for the preceding week and 105.5 percent for the corresponding week a year ago. This does not include mills producing newsprint exclusively. Paperboard production was 102 percent for the current week compared with 102 percent for the preceding week and 98 percent for the corresponding week a year ago.

Hope of establishing a newsprint mill in the northern tier counties of Pennsylvania has turned on the practicability of using the wood of the quaking aspen tree. In recent weeks a committee of Pennsylvania publishers have toured the northern Pennsylvania areas in search of wood and waterpower suitable for a mill. They found the southern slopes of many cut-over timber areas fairly well covered with the quaking aspen. A hardwood variety, this tree matures quickly, but is said to lack the long fibers of evergreen varieties used in newsprint manufacture. However, it has been shown commercially and by experiment that paper of acceptable nature can be made from a number of them by departure from conventional practice. For instance, the newsprint now made in the South from pine is made with about 25 percent of semi-bleached sulphite pulp in place of the unbleached sulphite pulp used in conventional newsprint, the balance being pine groundwood. . . . Results of the first nationwide forest resource appraisal indicated an actual stand of 1,670,505,000 cords of pulpwood in the United States. With the growth of pulpwood at 32,414,000 cords last year, and annual pulpwood consumption at around 20,000,000 cords, it appears that the United States can become self-sustaining within 10 years as far as newsprint is concerned if the raw material is utilized.

Great Britain will reduce imports of newsprint to make way for increased food, raw materials and machinery imports. Britain's decision to cut down on her use of newsprint is not expected to affect Canada materially. Canada is receiving requests for more newsprint from almost every country in the world. The cut in newsprint indicates a temporary return of four-page newspapers in England. . . . Austria is producing a near record supply of newsprint this year, but requirements of the Allied occupation forces keep Austrian publishers from getting enough for themselves. Allied newspapers constitute four of Vienna's nine dailies. Supplies have reached 90 percent of the peak mark set in 1937. Still dailies have had to drop back to their post-war normal of four-page tabloid-size editions on week-days, and eight on Sundays.

Wood Pulp

Sweden's exports of wood pulp to the United States is expected to reach 450,000 tons this year. While Sweden may be anxious to obtain more United States dollars in return for increased pulp exports, that country is not yet in a position to increase wood pulp exports. Shortages of fuel, labor and chemicals continue to hamper Swedish paper and pulp mill operations and are expected to limit total Swedish pulp output this year to 1,500,000 tons, against the 2,500,000 tons produced 10 years ago.

When the fuel and labor situation eases, pulp production in Sweden may increase from 1,500,000 tons to a total of 2,000,000 tons. But the reduction in output from pre-war levels may result in the maintenance of high price levels for Swedish pulp for a number of years.

Waste Paper

Waste paper collections for the first 25 weeks of 1947 were 12.4 percent greater than for the corresponding week in 1946, and 16.5 percent ahead of the same period in 1945. . . . With paper mills shut down for their customary inventory check and vacation period during the first two weeks of July, the waste paper market is rather quiet.

Some concern is expressed by waste dealers on the possibility of over-accumulation of waste stocks during the shutdown period. Trade reports indicate some mills may remain closed longer than the usual two-week period in order to make extensive repairs on the overworked paper mills. Waste dealers, meanwhile, are wondering what effect heavy accumulations of waste paper will have on the market by the time paper mills reopen.

Rags

Paper mills, as a rule, are not accepting shipments for rags until they reopen later this month after their repair and vacation period is over. Despite the inactivity most quotations remained at recent levels.

Wisconsin Wages Rise As Payrolls Shrink

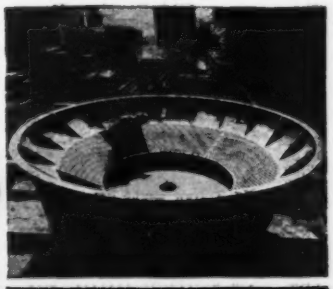
MADISON, Wis.—Employment in the manufacture of paper and other products showed a 1.1 percent decline in May as compared with April in Wisconsin, according to the Industrial Commission of Wisconsin. Weekly payrolls, however, advanced 1.3 percent in the same period. There were 27,400 employes in May and 27,700 in April.

The estimated weekly payrolls averaged a total of $1,384,000 in May, compared with $1,369,000 in April. The average hourly pay was $1.146, and the average week was 44.2 hours. Weekly earnings per worker averaged $50.60.

Twenty firms engaged in the manufacture of paper and allied products in Milwaukee county reported 3,214 employes on their payrolls in May, a decline of 3.4 percent compared with April. Weekly payrolls totaled $167,396, a drop of 3.1 percent. Average hourly pay was $1.158, and the average week was of 45 hours. Thus workers received average weekly pay of $52.08.

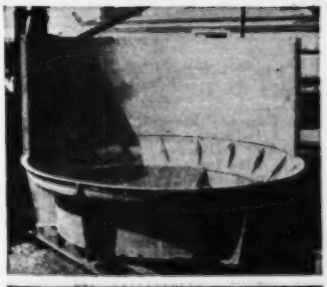
How the new DILTS Hydrapulper SAVES YOU MONEY 4 WAYS

1 Cuts assembly time
2 Resists corrosion and wear
3 Protects paper stock
4 Boosts output



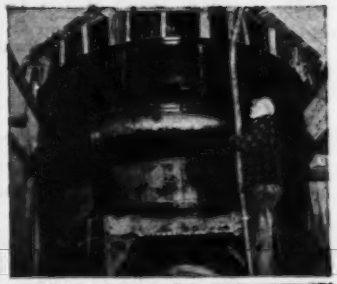
1 WELDING STATIONARY VANES of pure Nickel to the dished bottom of the Nickel-Clad Steel hydrapulper.

2 INSTALLING EXTRACTOR PLATES on the completed bottom. This section is now almost ready for shipment.



3 SIDE PLATES of rolled Nickel-Clad Steel are made in two sections. They are joined to each other and to the bottom plate by welding on the job.

4 INSPECTING THE WELDS. Permanently leakproof, the welded seams eliminate caulking, help reduce vibration, provide more rigid construction.



5 LOOKING INTO the completed Dilts Hydrapulper from upper level. The rotor, made of 3% nickel cast iron for resistance to wear and abrasion, reduces furnish to slush at 195 rpm.

6 EXTERIOR VIEW from lower level. This all-welded unit of Lukens Nickel-Clad Steel was designed jointly by Smith & Caffrey Co., Syracuse, and Dilts Machine Works, Fulton, N. Y., a division of Black-Clawson Co., Inc., Hamilton, O.

FOUR WAYS, did we say? Better change that to *five.*

For this hydrapulper is constructed almost entirely of Lukens Nickel-Clad Steel.

And that means another saving. Lukens Nickel-Clad Steel not only protects your paper stock from rust stains and other damage, *it brings you all the strength and corrosion-resisting qualities of pure Nickel at a much lower price than you'd pay for the solid metal.*

Credit the SMITH & CAFFREY COMPANY, Syracuse, and the DILTS MACHINE WORKS, Fulton, N. Y., for this simple and efficient hydrapulper design. It permits building and shipping the unit in four sections. It saves construction cost and time. It saves shipping time and space and weight. And it makes final assembly an easier, quicker job!

The twelve-foot-diameter hydrapulper you see pictured here is now in service at the National Paper Corporation plant in Ransom, Pa. They use it mostly for processing facial and toilet tissues.

At National, the basic furnish is a combination of virgin pulps and reclaimed paper. It is quickly broken down to flowable form by the rotor which turns at 195 rpm. Each batch is thoroughly defibered and blended in a matter of seconds.

In the pulp and paper industry, Lukens Nickel-Clad Steel is widely—and wisely—used wherever rust and corrosion threaten quality production or endanger equipment life. You'll find a lot of helpful information about this economical construction material in the illustrated booklet, ***Lukens Clad Steels.*** Write us for your free copy.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
NICKEL INCO ALLOYS
TRADE MARK

MONEL* • "K"* MONEL • "S"* MONEL • "R"* MONEL • "KR"* MONEL
INCONEL* • NICKEL • "L"* NICKEL • "Z"* NICKEL *Reg. U. S. Pat. Off.

PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—
Roll, contract ....$90.00 to —
Sheets .....$109.00 " —

Kraft—per cwt.—Carload Quantities

Zone A, Delivered
40 lb. base weight

Superstandard Wrapping	$7.00	to	—
No. 1 Wrapping	6.50	"	6.75
Standard Wrapping	6.00	"	6.25
Standard Bag	5.75	"	6.25

Tissues—Per Ream 24x36 (480) 10 lb. Zone 1.

Wh. No. 1 Frd.	1.35	to	1.65
Wh. No. 1 M. G.	1.35	"	1.65
Wh. No. 1½	1.20	"	1.45
Wh. No. 2	1.30	"	1.55
Wh. Anti-Tar	2.75	"	4.25
Kraft Unbl.	1.45	"	1.85
Manila No. 2	1.25	"	1.45

Toilet—Per Case of 100 rolls—1 M Sheets.

Unbleached	4.47	to	5.50
Bleached	6.50	"	—

Paper Towels—Per Case of 3750—Zone 1.

Wh. C. fold 11x13½	4.39	to	4.80
Br. Sgl. fold 10 in.	2.67	"	3.00
Br. M'tif'd 9½x14¾	3.78	"	4.15
Br. M'tif'd 9½x9¾	2.67	"	3.00

Manila—per cwt.—C. l. f. a.

No. 1 Jute	11.25	to	—
No. 1 Manila 35 lb.	6.00	"	7.00

Boards, per ton—

News	$92.50	"	—
Chip	90.00	"	—
Sgl. Mla. Lt Chip*	102.50	"	—
White Pat. Coated*	120.00	"	—
Kraft Liners 42 lb.	95.00	"	—
Binders Boards	126.00	"	—

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 90-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1: Rag Content Bonds and Ledgers—

White, Assorted Items
Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.00	$48.00
100% Rag	46.50	43.00	41.25
75% Rag	35.00	32.50	31.50
50% Rag	31.50	28.75	27.50
25% Rag	28.00	25.50	24.50

Ledgers, per cwt.

100% Rag Ext. No. 1	$54.25	$50.00	$48.00
100% Rag	46.25	42.50	40.75
75% Rag	36.00	33.25	31.75
50% Rag	31.00	28.00	27.00
25% Rag	27.25	24.75	23.75

Sulphite Bonds and Ledgers—
White, Assorted Items
Bonds, per cwt.

No. 1	$18.75	$16.25	$15.50
No. 2	17.00	15.25	14.50
No. 4	16.00	14.50	14.00

Ledgers, per cwt.

No. 1	$17.00	$17.00	$16.35
No. 2	17.75	16.25	15.50
No. 4	17.00	15.00	14.25

Free Sheet Book Papers—
White, Cased Paper

(Per cwt.)	Case	Ton
No. 1 Glossy Coated	$19.40	$18.60
No. 2 Glossy Coated	18.15	17.35
No. 3 Glossy Coated	17.65	17.00

(Per cwt.)	Case	Ton
No. 1 Antique (Water marked)	$14.90	$14.25
No. 2 Offset	15.35	14.70
A Grade E. F.	13.90	13.30
A Grade S. & S. C.	14.40	13.70
B Grade E. F.	Nominal	
B Grade S. C.	Nominal	
C Grade E. F.	Nominal	
C Grade S. C.	Nominal	
D Grade E. F.	Nominal	
D Grade S. & S. C.	Nominal	

Wood Pulp

Domestic mill prices delivered with former OPA freight allowances.

	Per Short ADT
Groundwood	$75.00 to $80.00
Unbleached Sulphite	115.00 " 117.00
Bleached Sulphite	121.00 " 125.00
Bleached Soda	115.00 " 120.00
Unbleached Kraft	112.50 " 120.00
Southern Kraft	90.00 " 102.50

Canadian mill Prices delivered with freight allowances unless otherwise specified:

	Per Short ADT
Select Unbleached Kraft (no freight allowance)	115.00 " —
Unbleached Sulphite	115.00 " 117.00
Glassine Unbleached Sulphite (no freight allowance)	112.00 " —
Bleached Soda	105.00 " 115.00
Groundwood	75.00 " 80.00
Sideruns Pulping News	75.00 " 80.00
Hardwood and Specialty Grades	Nominal

Swedish Quotations
Ex. dock, New York

	Per Short ADT
Bleached Kraft	$150.00 to 156.00
Bleached Sulphite	151.00 " 158.50
Unbleached Sulphite	121.00 " 131.00
Unbleached Kraft	116.00 " 126.00

Finnish Quotations
Ex. dock, New York

	Per Short ADT
Bleached Sulphite	$165.00
Unbleached Sulphite	132.50
Unbleached Sulphite (special grade)	137.50
Unbleached Sulphate	132.50
Unbleached Sulphate (special grade)	159.00

New Domestic Cotton Cuttings

(Prices delivered Mill Plus Dealer's Commission)

White Shirt	$11.50	to	$12.00
Light Silesias	7.50		
Unbleached Muslin	11.50	"	12.00
White Back Blue Overalls	8.25		
Blue Overalls	7.75		
Unbl. Fancy Shirt	4.50	"	5.00
Light Percales	5.50	"	6.00
Light Prints	5.25	"	5.95
Washables	4.00		
Bleachable Khaki	5.50	"	6.00
Unbleachable Khaki	5.00	"	5.50
Cottonades	4.50	"	5.00

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$5.00
No. 1 Whites Miscellaneous	4.25
No. 2 Whites Repacked	4.00
No. 2 Whites Miscellaneous	3.50
Blue Overalls	3.75
Thirds and Blues Repacked	3.00
Thirds and Blues Miscellaneous	2.50
No. 1 Roofing Rags	2.20
No. 2 Roofing Rags	2.10
No. 3 Jute Bagging	2.00
No. 4 Brussels and hard back carpets	2.00
No. 5A Roofing Rags	2.00

New Foreign Cotton Cuttings

(Prices delivered Mill)

	Per 100 lbs.
New Dark Cuttings	$6.00 to —
New Mixed Cuttings	6.50 " —
Light Silesias	9.00 " 10.00
Light Flannelettes	8.00 " 9.00
New White Cuttings	13.00 " 15.00
Fancy Shirt Cuttings	9.00 " 10.00
Light Prints	8.00 " 10.00
Bleachable Khaki, No. 1	7.00 " 7.50
Unbl. Khaki, No. 1	6.25 " 6.75

Old Foreign Rags

(F.O.B. New York)

	Per 100 lbs.
No. 1 White Linens	$14.00 to 16.00
No. 2 White Linens	12.00 " 13.00
No. 3 White Linens	8.00 " 9.00
No. 4 White Linens	8.00 " 9.00
No. 1 White Cottons	10.00 " 12.00
No. 2 White Cottons	8.00 " 9.00
No. 3 White Cottons	6.50 " 7.00
No. 4 White Cottons	5.00 " 5.50
Extra Light Prints	7.50 " 8.00
No. 1 New Light Prints	6.25 " 6.75
Med. Light Prints	5.25 " 5.75
Dutch Blue Cottons	5.25 " 5.50
Checks and Blues	4.00 " 4.25
Linsey Garments	3.00 " 3.75
Dark Cottons	2.50 " 3.00
Old Shopperies	2.50 " 3.00
New Shopperies	2.50 " 3.00

Bagging

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny, No. 1	$4.75 to 5.00
Domestic Gunny, No. 1	4.25 " 4.50
Light Wool Tares	4.50 " 4.75
Heavy Wool Tares	4.75 " 5.00
Bright Bagging	4.25 " 4.50
Foreign Manila Rope	6.00 " 7.00
Domestic Manila Rope	5.75 " 6.50
Jute Strings	4.50 " 5.00
No. 1 Sisal Strings	5.50 " 6.00
Mixed Strings	1.75 " 2.50

Waste Paper

Prices to Mills
(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	@	$120.00
No. 1 Hard White Envelope Cuts	90.00	"	100.00
No. 1 Hard White Shavings, unruled	100.00	"	110.00
No. 1 Hard White Shavings, ruled	80.00	"	90.00
Soft White Shavings, one cut	95.00	"	105.00
No. 1 Soft White Shavings	85.00	"	90.00
Soft White Shavings, Misc.	65.00	"	75.00
No. 1 Fly Leaf Shavings	55.00	"	60.00
No. 2 Fly Leaf Shavings	50.00	"	55.00
No. 1 Groundwood Fly Leaf Shavings	30.00	"	33.00
No. 2 Mixed Groundwood Fly Leaf Shavings	(nominal)		
Mixed Colored Shavings	(nominal)		
Mixed Groundwood Colored Shavings	(nominal)		
Overissue Magazines	(nominal)		
No. 1 Heavy Books & Magazines	30.00	"	37.50
Mixed Books	15.00	"	20.00
No. 1 White Ledger	60.00	"	65.00
New Manila Envelope Cuttings, one cut	100.00	"	110.00
New Manila Envelope Cuttings	65.00	"	75.00
Extra Manilas	35.00	"	40.00
Mixed Kraft, Env. & Bag Cuttings	75.00	"	85.00
Kraft Envelope Cuttings	100.00	"	105.00
Triple Sorted, No. 1 Brown Soft Kraft	60.00	"	70.00
New 100% Kraft Corrugated Cuttings	60.00	"	70.00
No. 1 Assorted Old Kraft	40.00	"	50.00
New Jute Corrugated Cuttings	27.00	"	—
Old 100% Kraft Corrugated Containers	(nominal)		
No. 1 News	19.00	"	20.00
No. 1 Mixed Paper	17.00	"	19.00
Box Board Cuttings	20.00	"	—
White Blank News	75.00	"	80.00
Overissue News	(nominal)		
Old Corrugated	28.00	"	30.00
Mill Wrappers	22.00	"	25.00

Twines

All Prices Nominal
(F. o. b. Mill)
(Soft Fiber)

Coarse Polished—India	.36	@	.39
Fine Polished—Fine India	.31	"	.36
Unpolished—			
Paper Makers	.30	"	.36
Tube Rope	.33	"	.37½
Wrapping	.36	"	.39½
Cotton	.70	"	—
(Hard Fiber)			
Mex. Sisal	.21	"	.24
Manila	.33	"	—
(Hemp)			
Polished Hemp	.63	"	—

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings—			
New White No. 1	.10½	@	.11
New White No. 2	nominal		
Light Silesias	.07½	"	.08
Black Silesias, soft	.06½	"	.07
New Unbleached	.10½	"	.11¾
Washable Prints	.06¾	"	.07
Washable No. 1	.05	"	.05½
Blue Overall	.07¾	"	.08
Cottons—According to grades—			
Washable Shredding	.03½	"	.04
Fancy Percales	.06¾	"	.07¼
New Black Soft	nominal		
Khaki Cuttings—			
Unbleachable Cotton Cuttings	.05½	"	.06
Bleachable Cotton Cuttings	.06½	"	.07
Men's Corduroy	.05½	"	.06
Ladies' Corduroy	.05	"	.05½
Cottonades	.05½	"	.06

Domestic Rags (Old)

(F.O.B. Eastern Shipping Point)

White No. 1—Repacked	4.50	@	5.00
Mixed White	4.00	"	4.35
White No. 2—Repacked	3.50	"	3.75
Thirds and Blues—			
Miscellaneous	2.25	"	2.50
Repacked	2.75	"	3.00
Roofing Stock—			
Foreign No. 1	nominal		
Domestic No. 1	2.00	"	2.05
Domestic No. 2	1.90	"	1.95
Roofing Bagging	1.90	"	1.95
Old Manila Rope	5.75	"	6.00

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1—Foreign	nominal		
Domestic	4.25	@	4.50
No. 1 Clean Bright—Sisal Strings	.04	"	.04½
No. 2 Clean Bright—Sisal Strings	.03	"	.03½
Sisal Jute	.03¾	"	.03
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.85

$5000 REWARD

Since the first issue of Paper Merchandising May 1947, the Paper Merchants have rewarded our efforts by sending us $5000 for subscriptions.

To be very frank, we anticipated a much smaller response, since we have only printed two monthly issues and 8 news supplements.

And the preponderance of subscriptions from owners, partners and executives of the Paper Merchant houses is such that we offer you now the highest type of paid circulation it is possible to secure.

To those who have sent us their subscriptions—Thank you. To those who want to reach the Paper Merchants through a new and different publication, we will be very happy to furnish complete rates and data.

LOCKWOOD PUBLISHING CO.

15 West 47th Street New York 19, N. Y.

Wool Tares, heavy	4.00	"	4.25
New Burlap Cuttings	6.00	"	6.50

Old Papers

(F. o. b. Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	@	$115.00
No. 1 Hard White Shavings, unruled	100.00	"	—
Soft White Shavings, one cut	90.00	"	95.00
White Blank News	60.00	"	65.00
Soft White Shavings	80.00	"	—
No. 1 White Ledger	75.00	"	80.00
Ledger, colored	60.00	"	65.00
No. 1 Heavy Books & Magazines	40.00	"	45.00
Overissue Magazines	nominal		
New Manila Envelope Cuttings	80.00	"	—
No. 1 Assorted Old Kraft	60.00	"	65.00
No. 1 Mixed Paper	20.00	"	—
Box Board Cuttings	20.00	"	—
Kraft Corrugated Cuttings	nominal		
Old Corrugated	30.00	"	35.00
Overissue News	40.00	"	—
No. 1 News	—	"	30.00

BOSTON

Old Papers

(F. o. b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled	7.00	@	8.00
No. 1 Hard White Shavings, ruled	7.00	"	8.00
Soft White Shavings, Misc.	6.25	"	6.50
No. 1 Fly Leaf Shavings	1.65	"	1.80
No. 2 Fly Leaf Shavings	2.00	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	1.25	"	1.50
Mixed Colored Shavings	2.50	"	2.75
New Manila Envelope Cuts, one cut	5.00	"	5.50
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	3.50	"	3.75
Mixed Kraft Env. & Bag Cuttings	3.75	"	4.00
Kraft Envelope Cuttings	3.75	"	4.00
No. 1 Heavy Books & Magazines	2.50	"	2.60
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	4.25	"	4.50
Groundwood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	3.50	"	—
No. 1 Mixed Paper	—	"	.95
Overissue News	1.50	"	1.75
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.50	"	—
Jute Corrugated Cuttings	1.07½	"	—
Paper Strings	2.25	"	2.50

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	—	@	4.75
Domestic	—	"	4.75
Sisal Rope No. 1	6.00	"	—
Sisal Rope No. 2	5.50	"	—
Mixed Rope	5.25	"	—
Mixed Strings	2.00	"	2.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		
Domestic	6.25	"	—
Soft Jute Rope	5.00	"	5.25
Jute Carpet Threads	6.00	"	—
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	—	"	4.75
Domestic	—	"	4.87½
South America	5.25	"	—
Wool Tares—			
Foreign	4.50	"	—
Domestic	4.50	"	—
Aust. Wool Pouches	5.00	"	5.25
New Zealand Wool Pouches	5.25	"	5.50
New Burlap Cuttings	6.00	"	6.50
Heavy Baling Bagging	5.25	"	5.75
Paper Mill Bagging	3.50	"	3.75
No. 1 Roofing Bagging	1.75	"	—

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.08	@	—
Fancy Percales	.07½	"	.08
New White No. 1	.11	"	.11½
New Light Flannelettes	.08	"	.08½
Canton Flannels, Bleached	.10	"	.11
Underwear Cutters, Bleached	.10	"	.11
Underwear Cutters, Unbleached	.11	"	.12
Silesias No. 1	.08	"	.08½
New Black Silesias	.05	"	—
Red Cotton Cuttings	.05	"	—
Blue Overalls	.08½	"	.09
Soft Unbleached	.11	"	.12
Blue Cheviots	.08½	"	.09
Fancy	.06	"	—
Washable	.06	"	—
Khaki Cuttings	.06½	"	.07¼
Corduroy	.03½	"	—
Khaki Canvas	.06¼	"	.06¼
B. V. D. Cuttings	.10½	"	.11¼

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	2.00	"	—
No. 2	1.90	"	2.00
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	6.00	"	—

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)
Mill Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	$110.00	@	$120.00
No. 1 Hard White Shavings, unruled	105.00	"	115.00
No. 1 Soft White Shavings	80.00	"	95.00
No. 1 White Ledger	55.00	"	65.00
No. 1 Heavy Books & Magazines	40.00	"	43.00
White Blank News	43.00	"	49.00
Mixed Kraft Env. & Bag Cuttings	75.00	"	85.00
No. 1 Assorted Old Kraft	45.00	"	55.00
Overissue News	28.00	"	—
No. 1 News	20.00	"	—
No. 1 Mixed Paper	12.00	"	—
Old Corrugated	30.00	"	—
Mill Wrappers	22.00	"	—

MARKETS

BLANC FIXE—Supplies adequate to meet steady demand, deliveries fair. Pulp is currently quoted at $55 per ton, in barrels, car lot, at works; and $60 less car lots same basis.

BLEACHING POWDER—Supplies tight although paper mill demand has eased up. Shipments improved. Quotations are unchanged. Prices on bleaching powder range from $2.75 to $3.75 per 100 pounds.

CASEIN—Current prices on processed acid precipitated casein are reported around 24 to 26 cents per pound for domestic grades and 28 to 32 cents for imported grades f.o.b. shipping point.

CAUSTIC SODA—Market continues tight, relief expected as new production arrives. Solid caustic soda is reported at $2.50 to $2.75 per 100 pounds; flaked and ground offered at $2.90 to $3 per 100 pounds, car lots, at works.

CHINA CLAY—Heavy demand, continues, supply tight. Domestic filler clay is currently $9 to $11 per ton, car lots. Coating clay is currently $15 to $30 car lots. Imported clay is currently quoted at from $18 to $35 per ton, in car lots, export warehouse.

CHLORINE—Strong demand continues in a tight market. Lack of tank cars continues to hamper deliveries. Quotations unchanged. Chlorine is currently quoted at $2 to $3.50 per 100 pounds.

ROSIN—Gum Rosin in drums per 100 pounds, net, in yard New York, car lots, B, D, E, $8.85; F, G, H, I, K, M, $9.01; N, $9.05; WG, $9.06; WW, $9.25. Wood Rosin per 100 pounds, l.c.l., f.o.b. N. Y., B, $6.95; FF, $8.20; G, H, I, $8.35; WG, $8.65; WW, $8.81; X, $8.91.

SALT CAKE—Demand continues to increase as supply shows little improvement. Prices remain unchanged. Domestic salt cake is quoted at $20 to $26 per ton in bulk. Chrome salt cake is quoted at $20 to $26 per ton.

SODA ASH—Demand active as supplies continue short, previous orders filled. Contract orders prevail at the same high levels. Current prices, car lots, per 100 pounds, are as follows: in bulk, $1.08; in paper bags, $1.20; and in barrels, $1.60.

STARCH—Capacity production absorbed by active demand, export demand eased up. Starch prices continue strong with the pearl grade quoted at $5.57 per 100 pounds; powdered starch at $5.68 per 100 pounds, car lots, Chicago.

SULPHATE OF ALUMINA—Active demand covered by fair supplies. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is quoted at $1.95 to $2.25 per 100 pounds, in bags at works.

SULPHUR—Plentiful supplies to meet active domestic and export demands. Annual contracts are quoted at $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf Ports is $19.50 per long ton.

TALC—Domestic and French grades are moving in fair volume with prices steady. Domestic grades are currently quoted at from $16 to $30 per ton at mines; Canadian at $35 to $45 per ton. All prices in car lots.

• PAPER—WOODPULP •

EXPORT **IMPORT**

OFFICES: GOTHENBURG · LONDON · SAO PAULO · BUENOS AIRES · RIO DE JANEIRO · SHANGHAI

FLOF HANSSON INC.

NEW YORK, U. S. A.

220 EAST 42ND STREET NEW YORK 17, N. Y.

DIGESTED

I think we have had enough experience to know very well that fear of anything does not bring out in the individual the best that he has and I do not believe that there is any plan whereby fear or any form of fear can ever be used to get the best out of the individual. It therefore seems to me that if we are going to get an answer to this problem we must approach it with a new philosophy. And, obviously, unless we can get an answer to this problem, the future will be extremely dark for all concerned.

First of all, it seems to me, this philosophy must admit one thing; there is no such thing as Management and Men being in two warring camps. What, I ask, is the difference between Management and Men? No one yet has been able to write specifications of what is Management and what is Men.

It becomes perfectly true to anyone who will think this thing through that there is no such thing in an industrial activity as Management and Men having different functions or being two different kinds of people. Why can't we think and why don't we think that all people are Management? — By JAMES F. LINCOLN, *President, Lincoln Electric Company.*

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1947		Corresponding Weeks—1946	
May 24	105.1	May 25	99.2
May 31	105.6	June 1	96.3
June 7	106.7	June 8	104.0
June 14	107.2	June 15	104.0
June 21 (Revised)	106.1	June 22	106.2
June 28	*105.9*	June 29	105.5

COMPARATIVE MONTHLY SUMMARIES

1946							
Jan.	94.7	June	104.6	Dec.	97.0	Mar.	106.1
Feb.	98.4	July	94.0	Year Avg.	101.1	April	105.1
Mar.	104.4	Aug.	104.7			May	106.2
Apr.	102.7	Sept.	101.3	1947		June	*106.6*
May	100.7	Oct.	106.4	Jan.	102.1		
		Nov.	105.5	Feb.	105.9		

COMPARATIVE YEARLY SUMMARIES

	1940	1941	1942	1943	1944	1945	1946	1947
Year to Date	87.2	92.7	97.9	88.3	88.6	89.0	100.6	*105.5*
Year Average	85.6	97.4	90.4	87.8	88.1	89.4	101.1	

PAPERBOARD OPERATING RATIOS†

Current Weeks—1947		Corresponding Weeks—1946	
May 24	101	May 25	93
May 31	98	June 1	85
June 7	98	June 8	96
June 14	103	June 15	98
June 21	102	June 22	97
June 28	*102*	June 29	98

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1946	90	91	100	99	94	97	89	99	96	100	99	92	96
1947	99	103	101	100	101	*101*							

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

EDITORIAL

Costs and Caution

One discouraging factor in the face of high production is costs. Elliott Little, president of Anglo-Canadian Paper Mills, stated that the recent rise in mill wages is equivalent to $3 per ton. Woods wages are up $4 a ton over 1946. Freight increases total close to $1.50 a ton. Heavy rains have increased the wood costs of many companies. New Brunswick International Paper, Fraser Brothers in New Brunswick and Marathon Mills at the head of the lakes have had to contend with high water and broken booms. In some cases salvage operations run as high as $10 a cord.

History is something else that cannot be overlooked. Prosperity of the industry is closely tied to U. S. consumption of newsprint. While the U. S. per capita consumption has shown an upward climb through boom and depression, it has also taken some bad bumps. In 1928 per capita consumption was approximately 225 lbs.; five years later it was down to a little more than 150 lbs.

The Federal Reserve Board's index figure for first quarter business is 186 (1935-39 equals 100). In 1947 the figure was 113, in 1938 it was 89 and 1933 it is shown as 69. In a business recession, per capita consumption of paper will fall back, on the basis of its past record.

With uncertainty in the wind, two questions are currently being asked: Are present profits high enough to tide the industry over any rough weather ahead? Can the industry "take it?"

Alaska

There is something hypnotic about the far Northwest, it appears, in view of the constantly recurring emphasis on Alaska as a potential—if not at present a promising—source of newsprint. Even when it must be acknowledged that present high building costs, increased even further by the remoteness of location, would have to be capitalized against the day that competition might push prices down on the output of those mills, the prospect of pulp and paper mills in Alaska is almost as pleasing to the Government agency as it is to the consumer who would buy from any source if only he could get delivery. Thus the United States Tariff Commission in its semi-annual report delves into a project that has been advanced and urged by another Bureau of the Government.

The large volume of timber in southern Alaska, the Commission declares, makes that territory a potential supplier of newsprint. Climatic conditions in the narrow belt of coastal islands along the western side of British Columbia favor a rapid and heavy growth of timber, and the pulpwood available within a few miles of tidewater is estimated at 150 million cords, sufficient to produce 1 million tons of newsprint annually. Much of this wood could be delivered to such mills as might be established within the area for not more than $6 to $9 a cord. Bids have been invited by the United States Forest Service on specified areas in the Tongass National Forest, but no construction has as yet been begun. Since any newsprint mills in the territory would probably be located at or near deep water transportation, their product would be able to compete with Canadian newsprint in both the west and east coast markets of the United States. However, certain rights granted the Indian tribes in this region must be given full consideration, and, until all questions concerning these and other matters are settled, it is unlikely that mills can be constructed and put into operation.

"Production of newsprint paper in Alaska could hardly be begun in any event in less than two years after the completion of arrangements. Not only would mills have to be erected and equipped following the necessary financial arrangements, but power sites would have to be developed, the necessary preliminary work in the woods completed, and logging equipment provided. To erect and equip a newsprint mill and to provide sufficient power and water, together with facilities for its permanent personnel, would cost at this time, according to industry estimates, between $55,000 and $60,000 per day ton of capacity, or, for a 250-ton mill, about 14 or 15 million dollars exclusive of timber rights. Hence, to produce 1 million tons of newsprint annually in Alaska would require an initial investment of well over 100 million dollars. What part of this amount at this time would represent a sound investment will doubtless be fully investigated before such steps are taken."

Foreign Trade Board

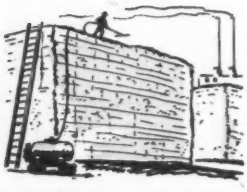
Senator Brewster of Maine has introduced a bill in Congress to change the name of the United States Tariff Commission to the United States Foreign Trade Board and to give the Board additional powers. The proposal would equip the Foreign Trade Board for a more positive role in world trade. In addition to its present duties, the bill, as analyzed by Warren B. Bullock, manager of the Import Committee of the American Paper Industry, proposes that the board study all factors directly or indirectly affecting the balance of international payments between the United States and Foreign nations and make recommendations for such changes in law regulation as may be necessary to encourage foreign trade and travel.

W. L. Cook

EDITOR

PROTECTION for exposed straw ricks

DOWICIDE G STOPS ROT LOSSES



Rot losses in baled straw stored in outdoor ricks can be prevented by treatment with Dowicide G. Three year tests conducted by one straw board mill have shown that losses, which may run to 15% of the straw during less than one year's exposure, are controlled by applying Dowicide G to the top tier of bales.

This important application is but one use of the Dowicides for preservation of agricultural residues. The straw board industry also uses Dowicides for the preservation of starch, for slime control, and in the manufacture of mold resistant board.

More information about this application of Dowicide G—and other uses of Dowicides—can be secured from the nearest Dow sales office.

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CHEMICAL COMMENTS

Dow Glycols Enter The Electrical Field

The five Dow Industrial Glycols, products of many-sided importance to a variety of industries, have extended their usefulness in the past few years into the electrical field. Modern small dry electrolytic radio condensers are made possible by virtue of the fact that glycols will dissolve appreciable quantities of boric acid. Diethylene Glycol is used successfully for this purpose, as it rates high as a non-volatile conductor that does not corrode aluminum.

Germicide Keeps Hydraulic Emulsions Bacteria-Free

The action of bacteria in the hydraulic systems of metal fabricating plants causes frequent shutdowns and costly hydraulic fluid replacements. This trouble can be eliminated by the use of as little as one part Dowicide A per one thousand parts of the soluble oil-water hydraulic fluid. This application of the Dowicides has been used with excellent results with other systems employing soluble oils.

Methocel Keeps Pigments Stable in Paints

Methocel (Dow Methylcellulose) is proving useful in many ways in the paint industry and especially to manufacturers of water-base paints. It keeps pigments from flooding, settling or caking, provides thickening and binding action, and also serves as a pigment disperser. Its protective colloid action insures emulsion stability. In addition, its controlled viscosity prevents undue penetration and assures excellent brushing characteristics.

Further information on any of these chemical developments is available on request.

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122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

Alkali and Heat Recovery in Deinking Systems*

By H. P. Bailey[1] and A. H. Nadelman[2]

Abstract

Several authors have shown the possibility of reusing waste liquor from the deinking of paper. A large part of the alkali is left in the waste liquor after deinking of stock since alkali-reactive materials in the paper are present only in small quantities.

Hot water extractions and laboratory deinking experiments on several different types of papers show that actual consumption of alkali is in the range 0.24 to 0.90% based on the weight of paper as received. This is less than one fourth of the amount of alkali added in the conventional methods of deinking. Further laboratory experiments show that the alkali in mill waste liquor can be reused for deinking and that it is possible to maintain the total alkalinity by the addition of small amounts of caustic before the liquor is used again.

If waste paper is deinked in a low density circulating system at 4% consistency and a cooking temperature of 170°F. with 4% of caustic soda based on the weight of the paper, it should be possible to effect economies in alkali and steam costs of about 70 and 50% respectively. These calculations are based on figures taken from the literature and do not represent production records of any particular mill.

A survey of the literature pertaining to waste liquor from the deinking of paper reveals that considerable attention has been given to the subject. Most of it has been concerned with the recovery of heat from, and the disposal of, the liquor. Little of it deals with the reclamation or reuse of alkali in the waste liquor. Irving *(1)* states that it is possible to reuse alkaline water from settled waste liquor. Traquair *(2)* mentions laboratory work done in connection with the reuse of liquors. Clark *(3)* states that in a certain mill the bulk of the liquor is blown off from a rotary boiler and reused. Morrison *(4)* cites an instance wherein a mill reuses the effluent from vacuum filtration of the deinked stock with a consequent saving in soda ash and steam consumption.

TABLE I.—CAUSTIC REQUIREMENTS OF WATER SOLUBLE EXTRACTIVES FROM WASTE PAPER

Grade of Paper	pH of Filtrate	Consumption on Weight of Paper as Received: at pH 7.0 % NaOH	at pH 7.0 lb. NaOH/ton	at pH 10.2 % NaOH	at pH 10.2 lb. NaOH/ton
Bond paper.....	4.8	0.02	0.41	0.09	1.70
Ledger paper...	4.7	0.03	0.69	0.10	2.07
Old books.....	4.5	0.06	1.10	0.16	3.17
Tabulating index cards...	4.9	0.01	0.23	0.17	3.36
Magazine A....	7.7	0.00	0.00	0.13	2.58
Magazine B cover only....	7.4	0.00	0.00	0.09	1.56
Magazine B inside pages..	7.8	0.00	0.00	0.12	2.44
Magazine C....	7.7	0.00	0.00	0.16	3.26
Magazine D inside pages..	7.8	0.00	0.00	0.10	1.98
Magazine E....	4.1	0.04	0.87	0.15	3.08
Bookstock mixture	7.9	0.00	0.00	0.11	2.21

TABLE II.—ALKALI CONSUMPTION DURING DEINKING

	pH of Filtrate	Caustic in Waste Liquor, % [2]	Total Alkalinity [1] of Waste Liquor, % [2]	Alkali Consumed: % [2]	Alkali Consumed: lb. NaOH/ton [2]
Bond paper...	11.5	1.71	3.43	0.54	10.8
Ledger paper..	11.5	1.77	3.42	0.55	11.0
Old books....	11.3	1.50	3.17	0.80	16.0
Tabulating index cards.	11.4	1.46	3.52	0.45	9.0
Magazine A..	11.6	1.25	3.73	0.24	4.8
Magazine B cover only..	11.8	2.10	3.73	0.24	4.8
Magazine B inside pages	11.7	1.21	3.37	0.60	12.0
Magazine C..	11.7	1.80	3.41	0.56	11.2
Magazine D inside pages	11.8	1.40	3.79	0.18	3.6
Magazine E..	11.6	0.82	3.07	0.90	18.0
Bookstock mixture ...	11.7	1.60	3.45	0.52	10.4

[1] Expressed in terms of NaOH.
[2] On the weight of paper as received.

Fundamental Aspects

For the purposes of this article the term "deinking" will be used to cover only the cooking phase of the entire process. A consideration of the chemical reactions taking place during the deinking or cooking phase will reveal that the consumption of alkali must necessarily be small since alkali-reactive materials, alum, sizing, natural resins, and saponifiable oils of the inks are present in the waste paper only in small quantities. Despite this fact some mills are using 3 to 6% of alkali on the weight of the waste paper being deinked, mainly for the purpose of achieving a reasonable speed of reaction and volume of production per unit of equipment. The waste liquor contains alkali, soaps, and other dissolved and suspended matter. From the standpoint of building a deinking liquor, the alkali and soaps are desirable materials.

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

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[2] Member TAPPI; Chairman, Western New York Group, TAPPI; Technical Superintendent, Mill No. 6, International Paper Co., Niagara Falls, N. Y.

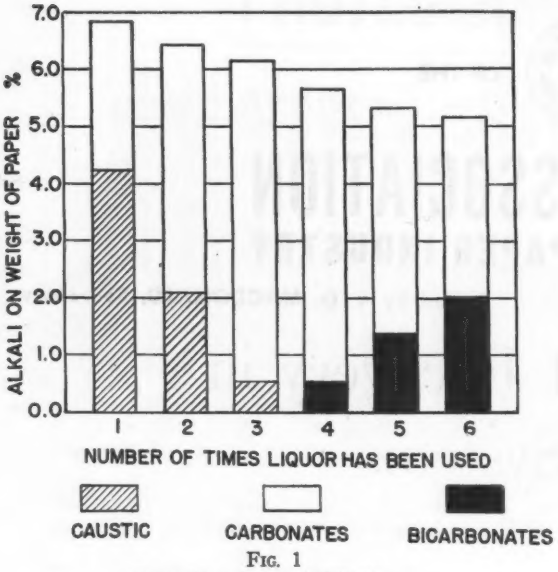

FIG. 1
Composition of Reused Mill Liquors

Water Soluble Extractives

To test the correctness of the above reasoning, hot water extractions were run on ten different types of waste paper and on a mixture of waste papers, hereafter referred to as the bookstock mixture. A sample of the paper was agitated for 15 minutes at a 4% consistency and a temperature of 170 to 180°F. The stock was suction-filtered repeatedly until a clear filtrate was obtained. A certain quantity of the filtrate was titrated potentiometically with sodium hydroxide to a pH of 7.0 and 10.2. The pH of 10.2 was chosen, because, according to Snell *(5)*, this is the "neutral point of soap."

Table I shows the pH of the filtrate and the caustic consumption of the water soluble extractives.

Laboratory Deinking

Deinking experiments were made on the eleven above mentioned samples of waste paper, using the same procedure with the addition of 4% of caustic on the weight of the paper. A sample of the clear filtrate was titrated potentiometically with hydrochloric acid. The results were calculated according to TAPPI Standard Methods *(6)*, "Analysis of Industrial Process Water," but expressed in terms of caustic soda.

The accuracy of the method as applied to the problem was tested on synthetic waste liquors made with known quantities of reagents. It has been found that the TAPPI Standard Method is suitable for the analysis of deinking waste liquor and that the results are reasonably accurate.

Table II shows the pH of the filtrate and the consumption of alkali.

From Table II it may be seen that the consumption of alkali is actually small, namely, in the range of 0.24 to 0.90% based on waste paper as received.

TABLE III.—COMPOSITION AND ALKALI CONSUMPTION OF REUSED MILL LIQUOR

Number of Times Liquor Has Been Used	pH of Liquor	Composition of Liquor: Caustic,[1] % [2]	Bicarbonates,[1] % [2]	Carbonates,[1] % [2]	Total Alkalinity,[1] % [2]	Alkali Consumed [1]: lb. NaOH/ton [2]	
1	11.6	4.24	0.00	2.56	6.80	...	...
2	11.6	2.07	0.00	4.38	6.45	0.35	7.0
3	11.5	0.61	0.00	5.54	6.15	0.30	6.0
4	11.2	0.00	0.57	5.06	5.63	0.52	10.2
5	10.6	0.00	1.34	3.98	5.32	0.31	6.2
6	10.1	0.00	1.73	3.42	5.15	0.17	3.4

[1] Expressed in terms of NaOH.
[2] On the weight of paper as received.

Deinking With Mill Waste Liquor

Laboratory tests of reusing waste liquor from the mill were made on the bookstock mixture. The above procedure was followed, but 6.8% of alkali on the weight of the paper was added in the form of mill waste liquor and evaporation losses were made up with water. The filtrate from the first deinked batch was used to deink the second; the filtrate from the second to deink the third; and so on. The quality of the deinked stock was satisfactory in all cases.

Table III and Fig. 1 show the pH and the composition of the liquors, the consumption of alkali, and the conversion of caustic into carbonates and bicarbonates.

Deinking Under Anticipated Mill Conditions

The laboratory procedure followed in deinking with mill waste liquor is not suitable for mill practice. The loss of liquor by evaporation and filtration and the alkali consumed by chemical reactions must be replaced. Furthermore, an adequate concentration of caustic alkalinity must be maintained, which automatically results in the elimination of bicarbonates at the start of the deinking cycle.

A laboratory trial of reusing waste liquor was made following the above procedure. The first liquor contained 4% caustic soda based on the weight of the paper, instead of the mill liquor. The filtrate from the first deinked batch was brought back to its original volume with water, and its total alkalinity was restored with caustic soda. The second and succeeding filtrates were treated in the same manner.

Table IV and Fig. 2 show the composition of the liquors before deinking. Table V and Fig. 3 show the composition of the liquors after deinking and the consumption of alkali.

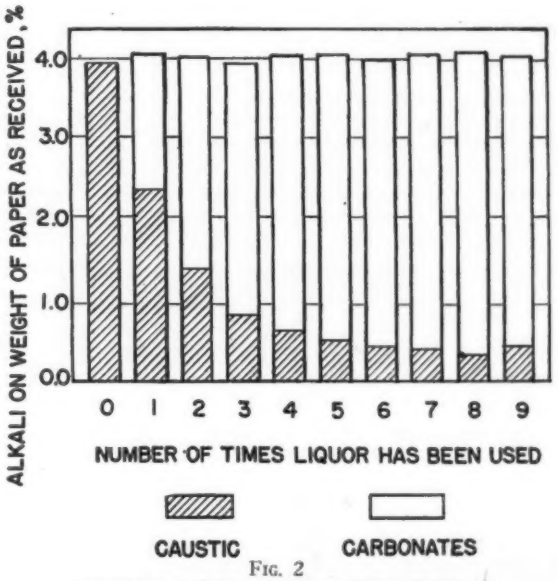

FIG. 2
Composition of Laboratory Liquor Before Deinking

TABLE IV.—COMPOSITION OF LABORATORY LIQUORS BEFORE DEINKING

Number of Times Liquor Has Been Used	Composition of Liquor			Total Alkalinity,[1] % [2]
	Caustic, % [2]	Bicarbonate,[1] % [2]	Carbonate,[1] % [2]	
0	3.97	0.00	0.00	3.97
1	2.37	0.00	1.71	4.08
2	1.43	0.00	2.58	4.01
3	0.89	0.00	3.09	3.98
4	0.63	0.00	3.39	4.02
5	0.51	0.00	3.53	4.04
6	0.44	0.00	3.56	4.00
7	0.40	0.00	3.64	4.04
8	0.36	0.00	3.73	4.09
9	0.43	0.00	3.60	4.03

[1] Expressed in terms of NaOH.
[2] On the weight of paper as received.

Alkali Economy

The following calculations are based on figures published by various authors, and do not represent the production records of any particular mill.

Assuming that waste paper is deinked in a low-density, circulating system at 4% consistency with 4% of caustic soda based on the weight of the paper, and that alkali is not reclaimed, the consumption of caustic soda per ton of waste paper would amount to 80 pounds. At a market price of $2.30 per 100 pounds *(7)*, this would represent a cost of $1.84 per ton of waste paper or $2.45 per ton of finished pulp, assuming a yield of 75%, as stated by Morrison *(8)*.

If the deinked stock were passed over a vacuum filter discharging pulp at 22% consistency *(4)*, 85% of the waste liquor could be recovered. This would be equivalent to 58 pounds of alkali expressed in terms of caustic soda per ton of waste paper and the actual consumption would be 22 pounds per ton. The cost of caustic would be reduced to $0.51 per ton of waste paper or $0.68 per ton of finished pulp—a savings of 72%.

If the deinking were done at a higher consistency, the savings would be correspondingly lower.

Steam Economy

Assuming that in the system above the cooking temperature is 170°F. and the all-year average temperature of fresh water is 50°F., the steam consumption, based on a method of calculation provided by Milham *(9)*, would be approximately 7100 pounds per ton of waste paper. Clark *(3)* and O'Donoghue *(10)* give 6000 pounds as a steam consumption figure for the low density circulating system. Using 6000 pound at $0.45 per 1000 pounds, the steam cost would be $2.70 per ton of waste paper or $3.60 per ton of finished pulp.

By reusing the waste liquor considerable heat would be recovered. Assuming that the stock goes to the vacuum filter at 170°F. and that the effluent leaves at 158°F., as stated by Morrison *(8)*, and allowing an additional 10% loss during handling of the effluent before it is returned to the digester, the steam consumption would be reduced to approximately 3100 pounds per ton of waste paper. The steam cost would be reduced to $1.40 per ton of waste paper or $1.86 per ton of finished pulp—a savings of 48%.

If the mill were operating with a higher consistency, the savings would be correspondingly less.

TABLE V.—COMPOSITION AND ALKALI CONSUMPTION OF LABORATORY LIQUORS AFTER DEINKING

Number of Times Liquor Has Been Used	pH of Liquor	Composition of Liquor				Alkali Consumed	
		Caustic, % [2]	Bicarbonates,[1] % [2]	Carbonates,[1] % [2]	Total Alkalinity,[1] % [2]	lb. NaOH/ton [2]	
1	11.6	1.47	0.00	2.07	3.54	0.43	8.6
2	11.2	0.42	0.00	3.06	3.48	0.60	12.0
3	10.7	0.00	0.23	3.26	3.49	0.52	10.4
4	10.4	0.00	0.55	3.00	3.55	0.43	8.6
5	9.9	0.06	0.68	2.86	3.54	0.50	10.0
6	9.8	0.00	0.73	2.85	3.58	0.46	9.2
7	9.8	0.00	0.83	2.74	3.57	0.43	8.6
8	9.8	0.00	0.82	2.88	3.70	0.34	6.8
9	9.9	0.00	0.79	2.78	3.57	0.52	10.4
10	9.7	0.00	0.90	2.85	3.75	0.28	5.6

[1] Expressed in terms of NaOH.
[2] On the weight of the paper as received.

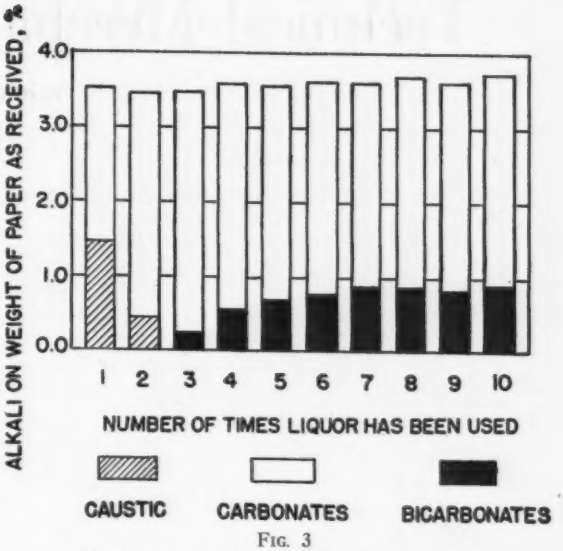

FIG. 3
Composition of Laboratory Liquor After Deinking

Conclusion

From the foregoing, it may be seen that considerable economies in alkali and steam consumption can be effected by recovery and reuse of waste liquor. The laboratory work indicates that it is possible to reuse the waste liquor. How the process works in mill practice will be the subject of a later article.

Acknowledgment

The authors wish to acknowledge the assistance of the laboratory staff of mill No. 6 and the help as well as contributions of Mr. Fred Andrews from the Division of Research.

Literature Cited

1. Irving, C. C., *Tech. Assoc. Papers* 15: 320-321, 336 (1932).
2. Traquair, J., *Tech. Assoc. Papers* 15: 321 (1932).
3. Clark, F. C., *Tech. Assoc. Papers* 26: 306-308 (1943).
4. Morrison, H. A., *Tech. Assoc. Papers* 26: 303-306 (1943).
5. Snell, F. D., *Tech. Assoc. Papers* 26: 116-118 (1943).
6. TAPPI Standard Methods, T-620 m-44.
7. *Paper Trade J.* 123, No. 26: 40 (Dec. 26, 1946).
8. Morrison, H. A., *Tech. Assoc. Papers* 15: 189-191 (1932).
9. Milham, E. G., *Tech. Assoc. Papers* 15: 355-356 (1932).
10. O'Donoghue, R., *Paper Ind. 22*, No. 9: 911-916 (Dec., 1940).

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Technical Merchandising of Paper*

By John W. Crosson[1]

Abstract

In order to retain new markets and applications for paper which were developed during the war and to further diversify its operations, the paper industry should make use of the technical man as a salesman and capitalize upon new materials, products, and processes.

A review of prewar merchandising practices reveals the technician occupying a minor role in the marketing plans of the industry and his efforts handicapped by relatively few raw materials with which to work. The end of the war has released many new materials which, with the proper application research, management view-point, and market surveys by trained technicians, should yield high dividends.

How such a program has been inaugurated by the Mead Corporation is described in some detail, and a case history of an old New England paper company is cited as an example of what can be accomplished by sales-minded technicians backed up by research-minded management.

As other basic industries are doing the paper industry might, at this time, critically examine its post-war merchandising plans in the light of the probable influence of new materials, methods, and processes on both its products and markets. That it is truly basic was quite forcefully demonstrated during the war period when paper stepped into the huge gap left by metals and other material shortages in many industries and came through with flying colors. This successful invasion should not be relinquished now that scarce materials are once again becoming readily available. Such industries as the textile, structural and building, steel and lumber, to mention a few, have been indicating for a long time through their trade magazines and writings a real concern for the inroads made by paper on their markets during the war. The beachhead is firmly established and cellulose, in one form or another, now has the opportunity of invading practically any industry it chooses.

It is suggested that in retaining these new product outlets and aggressively approaching other potential markets that management and sales include as an integral part of their new program, the technical salesman. By technical salesman the author refers not only to a sales enginer trained as such but also the mill chemist and technician whose point-of-view and approach to his work must become more product conscious. Diversification of markets should originate in the thinking of this man who has the technical tools at his command but lacks the essential industrial contacts, broad perspective, and necessary market information to successfully present to his sales and merchandising division a salable product. In order to clarify this idea the prewar sales policies of the industry are mentioned briefly, describing in some detail the experiences of the Mead Corporation in inaugurating such a program, and to indicate possible approaches and problems in the situation.

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

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1. *Chem. Eng. News* 23, No. 8: 710 (April 25, 1945).

History

The history of paper sales in this country, by and large, has been one of concentration upon standard brands and mill grades by the large manufacturers. These grades, in turn, have been confined in use applications because of limitations imposed by basic raw materials which consist primarily of three or four grades of pulp, sizes, adhesives, and various clays. A number of combinations and admixtures of these accounted for the papers offered the trade prewar. The sales divisions of the industry, invariably staffed by salesmen with no technical mill training, sold these grades against price competition and on a quality and friendship basis. Occasionally, inquiries would be presented to the mill for very profitable specialties whose specifications were such that the mill technicians, with the limited raw materials available, were not prepared to make. The fact that these inquiries were usually initiated by the prospective customers, who, of necessity, came to the paper manufacturer, emphasizes the lack of market research over and above the generally accepted purposes of surveys which were to locate new users of printing papers alone. Industrial contacts by salesmen were planned to sell standard grades and no attempt was made to indicate how paper might be substituted for other materials. This would have ben an extremely difficult proposition, anyhow, for an untrained salesman, and the results were that the only paper sold to these contacts were printing grades. Possible reasons for this state of affairs might be traced to a combination of lack of sales insight on the part of mill management in not capitalizing on new materials, methods, and processes to the fullest possible extent, and the general inertia prevailing in sales divisions making it impossible to report back in usable form to the mill, new and original market requirements. Sales management in the paper industry in the past, in contrast to other basic industries, has not seen fit to consider and make use of the technical man as a salesman. Prewar merchandising of paper had no place for him. He was consulted mostly in instances of complaints or was charged with lowering mill costs and control work. In consequence, diversification of products and markets suffered and the industry has been content with a small return on their huge capital investment. The industry cannot afford to slip back into its prewar competitive price and quality markets of standard mill brands and grades of printing papers. True, run-of-the-mill papers are bread and butter items during periods of depression, but it is the author's contention that there are lucrative fields waiting to be tapped through the efforts of the research chemist and engineer, once he has the necessary sales and merchandising viewpoint.

New Materials Available

Contributed in part by the speed-up of wartime research and development, many of the products and materials necessary for materially changing the characteristics of a sheet of paper to impart practically any property desired, within reason, are available today. Furthermore, this will be accomplished, and is

already being accomplished, during the papermaking operation. Contingent upon the designing and fabrication of the proper machines and the fundamental laboratory application research can anyone doubt the potential possibilities of these operations after having witnessed the minor revolution in the industry following the development of machine coating? The manufacture of functional and industrial papers, packaging and decorated papers, which in the past have usually required supplementary converting to secure such properties as waterproofing, moisture vapor resistance, greaseproofing, wet strength, dimensional stability, waxing, flexibility, tensile and bursting strength, coating and laminating, and impregnation and practical demonstrations. It might be of interest to mention here a few of the new products and some of their potentialities.

The growing synthetic and plastics field, of course, is the outstanding one for exploitation. Is it too fantastic to believe that once quantity production allows for price reduction, as it surely will, some synthetic material will not replace hard-to-handle clays as filler and coating materials? Or that some vinyl ester, tailor-made from single molecules in the laboratory, prove superior to casein, starch, etc. as an adhesive? Have the synthetic rubbers such as Perbunan, Vistanex, or Hycar, with their almost daily refinements and property improvements, been critically evaluated for what they might contribute to waterproofing, strength characteristics, etc.? How about the Sarans and Geon dispersions with water, ideally suited for papermaking processes? Then there are the new silicones and polyamides, such as Nylon, waiting to be modified and adapted to the industry; the new fibers of casein, vinyl compounds, and soybean available for combination with cellulose fibers. In considering these materials it should also be remembered that already the design and speed of printing presses is being adversely influenced by the failure of paper and inks to keep pace with their improvements. No doubt the answer to problems such as heat-set inks drying paper paper brittle, dimensional stability, tensile strength, and rapid setting of inks will be found among these materials.

Meanwhile, admit that present limitations in the industry preclude utilization of all these materials, and that fundamental laboratory research and development are necessary. At the same time, when one is "stymied" by old time-honored raw materials and it is decided that no further improvements are possible in the various products, turn to the new and start from there.

The Mead Corporation's Program

It might be of interest to describe the Mead Corporation thinking along these lines and what has been done about it.

Shortly after the war started, a long-range program was inaugurated which was designed to put the company in a position to take advantage of these new materials and developments once the situation allowed. The purpose was to become acquainted with suppliers of raw materials to the paper industry and to supply data to them on some of the most pressing problems. At the same time the company was receptive to any new ideas and processes which could be adapted to the manufacture of paper. This was a direct reversal of prewar procedures whereby a supplies came to a paper manufacturer *after* he had something to sell, and which product he might, as an afterthought, imagine the mill could use. Research men and engineers of suppliers became paper conscious. Nothing was set aside on a shelf until after it had been evaluated as of possible interest to the manufacturer of paper. As a direct result of this program it became necessary for the mill men to get out around the country, meeting people, and coming back with ideas. No industry was overlooked that maintained research laboratories or that might have something to contribute in the future. The company was willing to, and often did, act as "guinea pigs" for the initial testing of new products. The probing extended to milk companies, synthetic resin manufacturers, chemical raw material people, industrial laboratories, coffee importers, rubber manufacturers, machine designers, soap makers, oil companies, varnish cookers, newly incorporated companies, and the representatives were unfortunate enough to even contact a primary producer of uranium ore during the period of greatest secrecy. Investigations in that direction were of short duration. This work also consisted of an intensive search of current patent literature, and contacts from "kitchen sink inventors" was encouraged.

Gradually, this program has required the addition of new personnel, both in the mills and sales offices, and the establishment of a New Products Division of the Mead Corporation. It also became apparent, later, that market surveys of practically every industry in the country would be necessary to capitalize on the experiences and to locate uses for new papers. This was done, and the Advertising Department was called upon to back up the program with ads in the trade papers. Actually, never in the history of the corporation have sales and the mills cooperated as closely as they now are and it is believed that both have benefited greatly; the technical division by broader contacts with industry and the awakening of a sales point-of-view in the development of new products, while the sales division more keenly appreciates latent possibilities for opening up broader markets in the sale of paper. Any idea that such a program is easy to set into motion, and to maintain momentum once it is should be dispelled. Combined expenditures of time and money are required, but most essential the merchandising view-point of mill management and research must be present with the technical man actually engaged in the development of these products having the opportunity of combining his technical "know-how" with a keener appreciation of what makes a product salable.

Case History of a New England Mill

At this point an excerpt is given from an article entitled, "Management's-Eye View of Industrial Research" originally appearing in *Chemical and Engineering News (1)*.

"Case 1. A New England paper company, over one hundred years old, and known as a quality paper house. At the bottom of the depression when the plant was down to 30% of production capacity, an analysis of the business by the president and other executives indicated clearly that what was needed was product diversification-broadening of the line and new fields of application. They had an excellent research laboratory, a fine sales organization, and long and favorable contacts with quality paper buyers. They were selling 70% of their product as book paper to a number of national magazines, 20% of it to other paper companies for coating, and 10% for wallpaper stock."

"Paper was being bought on a price basis. Quality was secondary. The market for magazine paper was being shrunk because of the loss of advertising. These were the days when the *Saturday Evening Post* was running 70 and 80 pages. The laboratory research men were sent out with cards reading: 'Representative of the Blank Paper Company, Research Laboratories.' A standardized selling technique was given to them. Their promotional efforts were directed towards users of specialized industrial papers. Their first contacts were with the technical and research personnel of the buyers. Their first question was: 'Have you any special paper headaches?' When the precise scientific specifications for the paper were written, these were taken back to the laboratory as a challenge to produce what were known as specified industrial papers."

"One large manufacturer had a problem of an alkaliproof paper. Literally, carloads of soap had been sent back because of unsatisfactory wrapping. Within 3 weeks, against the competition of a number of larger paper companies, the laboratory licked this problem and made a customer for life of one of the largest soap manufacturers."

"To telescope the story, within a year and a half, eighty new industrial fields had been opened up for specialized industrial papers. Furthermore, premium prices were paid for these papers—not 3 or 4 cents a pound, but 7, 8, and 10 cents for papers with technology built into them. The company had more customers in more fields of industry within two years of gearing technical research to sales and sales promotion than it had developed in the one hundred years of its previous existence."

"While the profit returns were most satisfactory and the company was operating at capacity-plus within 2 or 3 years, the president of the company, in summing up the research advisory services, made this point: 'Everybody in the organization, from the president down to the backtender on the paper machine, is research minded. Research policies start in the president's office and percolate down through the organization, both in production and sales. Even the men in the plant who gather up the waste paper are suggesting that the research laboratory might reduce the amount of broke, and increase the profit margin."

Net results of case history No. 1: Management really understood the function of research, its relation to growth of the company, and its service function to sales and sales promotion. The research director was made a vice-president of the company, and provision was made for a continuous flow of ideas from the sales force back to the laboratory for new product development and new fields of application."

From the foregoing it should be quite evident that the technical man has a definite place as a salesman, within the broader meaning of the word, in the paper industry. It remains for management and sales to realize this fact and to make available the necessary training and facilities for him to function as such. Rather than confining him to the purely secondary role of mill technician and engineer, the technological progress of paper sales calls for a different conception of this man as a builder of new business, an originator of new products, and the backbone for the continued achievements of the paper industry in the future.

Literature Cited

1. *Chem. Eng. News*, V. 23, No. 8; 710, (April 25, 1945).

Formation of the Japan TAPPI

The Technical Association of the Pulp and Paper Industry of Japan was organized on February 15, 1947, at a luncheon held at Seiyoken Restaurant, Uyeno Park, Tokyo. This is the first scientific organization in the history of Japan to be interested solely in the technological and scientific aspects of pulp and paper manufacture. Membership is open to any individual interested. Contributing memberships, without voting power, are accepted from the pulp and paper mills and associate industries. The problems facing the industry are technological as well as economical. A serious shortage of technical personnel exists and it is anticipated that this "Japan TAPPI" will stimulate interest in the interchange of technical knowledge between the mill personnel.

It is planned to have a monthly technical magazine in order to contact all the mills in Japan. Interesting technical articles by the Japanese and translations from some of the more interesting foreign publications will be included. A testing laboratory is projected which will standardize the types and quality of Japanese pulps and papers.

Harold R. Murdock, Technical Consultant and Head of the Pulp and Paper Branch, Natural Resources Section, GHQ, SCAP, is sponsoring the new technical society. Mr. Hisashi Nakamura, Managing Director of Hokuetsu Paper Manufacturing Co., Ltd. is president of the technical society.

Successful Manufacturing

The McGraw-Hill Book Company recently issued a book on Fundamentals of Successful Manufacturing by George Gaynor Hyde, consulting engineer. This book is included in the Industrial Organization and Management Series (200 pp. 6 x 9). This book is largely a record of case studies in which the author has had experience. As stated by him it is an attempt to arrange the various details of manufacturing in logical order to clarify his own thinking and in doing so he feels that he has performed the same service for his readers.

Among the subjects covered in this popularly written book are: Determining the Policies; Processing the Product; Selecting the Facilities; Making the Layout; Choosing the Location; Evaluating the Organization; Personnel Practices; Planning Production; Management Controls; Research and Development.

Although the author does not relate any experiences in paper mills the case histories, of which there are 37, are fundamental in character and can be applied to any business.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y. at $2.50 per copy.

TAPPI Notes

R. W. Stephenson, formerly of Howerton Gower Company, is now chemist for the Kirby Chemical Company, Severn, N. C.

The partnership of Birk & Choporis has been dissolved. F. Paul Birk is now carrying on his own consulting engineering business at 64 W. Randolph St., Chicago 1, Ill.

The I. C. I. Standard Observer and Co-ordinate System and Their Use in Studies of the Color of Paper*

By J. A. Van den Akker[1]

Abstract

Spectrophotometric data in the form of spectral reflectance curves ("color curves") are most useful in connection with mill control of color and in fundamental studies of color. However, it is sometimes necessary or desirable to obtain accurate numerical expression of the color, or of a color difference, corresponding to a color curve or pair of curves. An objective and accurate psychophysical bridge between purely physical data and color sensation is afforded by the I.C.I. standard observer and co-ordinate system. The I.C.I. system is described, with particular reference to reflecting bodies (such as paper) and transparent bodies. Some applications of the I.C.I. system to problems in the paper industry are discussed.

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The pulp and paper industry in this country has generally employed accurate photoelectric color measuring instruments for more than twelve years, and most of the technical men of the industry are now well acquainted with spectrophotometric data in the form of the familiar "color curve." Such curves, illustrated in Fig. 1, present reflectivity (that is, reflectance of an opaque pad) relative to that of magnesium oxide against wavelength of monochromatic light. The usefulness of color curves is fairly well known. These curves are frequently employed for standardization of color, color matching, studies of dyes, fillers and pigments, studies of pulping and bleaching, investigations of "fading" of pulp and paper produced by natural and accelerated aging and light, identification of strongly colored components of wood and pulp, and for theoretical investigations on the optics of paper.

Much can and should be done directly with color curves. Past experiences in the paper industry, some of which have been published *(1-16)*, show that most problems can be effectively handled through qualitative comparison or theoretical interpretation of these curves, either in the form of spectral reflectance or spectral transmission. However, the question occasionally arises, "Admittedly the spectral reflectivity curve for this sample represents the most fundamental and accurate measure of color. But what is the color corresponding to this curve, and is there any way of characterizing the color in terms of numbers?" Perhaps more frequently one is asked, "The color curves for these two samples are different. What is the nature of the color difference, and is the difference significant?" If the color difference referred to is clearly perceptible, and if the differences in furnishes and dyestuffs in the samples are such that it would be impossible to bring about complete coincidence of the color curves, the most probable question to be anticipated is, "How can we modify the dye formula to obtain a better color match?"

The appearance of the color of a surface depends upon several factors, most important of which are the spectral reflectivity (color curve) of the surface, the spectral composition of the light employed in the viewing, the angles of illumination and viewing, and the observer himself. The appearance of the color difference between two samples also depends importantly on these factors. Considerations of secondary importance which should not be overlooked are intensity of illumination, angular extent of the viewed field, color and luminance of the field surrounding the viewed area, surface textures of the samples, and the physical condition of the observer.

The basic principles of spectrophotometry are old and well established. Accurate measurements can be made of the spectral energy distribution of the radiation from any light source, as well as of the spectral reflectivity or transmission of colored bodies. It is not so generally appreciated that work on the quantitative characterization of human color vision has been in progress for almost a century. A quarter century ago the Colorimetry Committee of the Optical Society of America gathered and rationalized data on color vision. A few years later, in England, Wright and Guild independently obtained data for a number of observers who, by careful test, were known to have normal color vision. The triads of additive primaries employed in the various studies were different—some employed filtered red, green, and blue light, whereas others used monochromatic red, green, and blue light; it was possible, however, to translate (through linear equations) from a set of tristimulus data based on one set of primaries to another set based on different primaries. Transformations of this kind showed that the data of O.S.A., of Wright, and of Guild were in very good agreement and in 1931 the International Commission on Illumination** carefully standardized the tristimulus data as well as data on standard illuminants, means for producing standard illuminants, geometry of illuminating and viewing, etc. The details of this standardization have been published by Smith and Guild *(17)* and Judd *(18)*; a less detailed but very readable treatment of the basic principles is given in the *Handbook of Colorimetry* by Hardy and co-workers *(19)* and a presentation of the subject prepared especially for technical men in the pulp and paper industry may be found in Instrumentation Studies XX *(20)*. More recently the Colorimetry Committee of O.S.A. has prepared an excellent comprehensive re-

* Presented before a joint session of the Inter-Society Color Council and the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 25, 1947.

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** Abbreviated I.C.I. in the United States and C.I.E. in England and other countries adopting the initials of the official French name.

port of the various physical and psychophysical aspects of colorimetry *(21)*.

The I.C.I. Standard Observer

When the I.C.I. averaged and standardized the tristimulus data of a number of normal observers, a so-called "standard observer" was brought into existence. It is believed that the difference between the color vision of this hypothetical observer and that of the average person having normal vision is trivial. The important thing, however, about the existence of the standard observer is that it provides an objective and scientific means for calculating, from accurate instrumental data, the numerical attributes of color —namely, dominant wavelength (descriptive of hue), purity (measure of saturation or "strength" of color), and luminous reflectance (measure of lightness and darkness).

The tristimulus values, X, Y, and Z, for light (entering the eye) characterize the color. They are, respectively, the luminance of the three primaries, red light, green light, and blue light, which are additively mixed in such proportion that the color of the light will be the same as that of light with which the mixed primaries are being compared. (The latter light might be, for example, that which is reflected from colored paper.) For certain colors to be matched, one or two of the tristimulus values would be negative—that is, the corresponding primaries would be *added to the light to be matched* instead of to the other primaries. This situation was considered undesirable and the I.C.I. in 1931 transformed the tristimulus data for actual primaries to data based on *unreal* primaries, so chosen that *all* real colors could be hypothetically obtained by purely additive combinations of the three unreal primaries. This mathematical artifice greatly simplifies the application of the I.C.I. system to the computation of colorimetric data, yet it does not detract from generality or reliability of application. The tristimulus data which were transformed are those of the standard observer for the spectrum colors (monochromatic light) for all wavelengths ranging from the violet end of the visible spectrum to the red end.

The tristimulus functions for the standard observer, after transformation to the I.C.I. unreal primaries, are shown in Fig. 2. An accurate tabulation of the tristimulus values may be conveniently found in Table XII of the *Handbook of Colorimetry (19)*.

It will be noted that the middle function (Fig. 2) has the familiar shape of the "visibility curve". It is, in fact, the standardized visibility curve, for, as a matter of further convenience, the transformation from real to unreal primaries was so chosen that the "green" I.C.I. distribution function would be identical with the luminosity curve of the normal human eye. This means that the Y tristimulus value *is also the luminous intensity of the light* (measure of lightness and darkness, irrespective of chromaticity).

The I.C.I. Co-ordinate System (Chromaticity Diagram

How does one apply the I.C.I. system to obtain a numerical description of the color of light entering the eye of the standard observer? From a purely physical point of view, the light is characterized by the distribution of energy throughout the spectrum. An illustrative curve giving this distribution for light after reflection from a sheet of blue paper is given in Fig. 3. Consider for a moment a spectral slice of the light, of wavelength width w; this is shown by the dotted lines in the figure. By definition of the quantity E given in Fig. 3, the light energy in the slice is wE, where E is the ordinate of the curve at the chosen wavelength. The tristimulus values for the light in this slice are $w\bar{E}\bar{x}$, $w\bar{E}\bar{y}$, and $w\bar{E}\bar{z}$. The light can be imagined to be divded into a large number of narrow spectral slices, and the contributions from all the slices are summed to obtain the tristimulus values for the total light, because it has been shown that tristimulus values are additive. If the first slice at the violet end of the spectrum is numbered 1, the next slice 2, etc., then the tristimulus values will be given by the following sums:

$$\begin{aligned} X &= w\bar{E}_1\bar{x}_1 + w\bar{E}_2\bar{x}_2 + w\bar{E}_3\bar{x}_3 + \cdots\cdots\cdots \\ Y &= w\bar{E}_1\bar{y}_1 + w\bar{E}_2\bar{y}_2 + w\bar{E}_3\bar{y}_3 + \cdots\cdots\cdots \\ Z &= w\bar{E}_1\bar{z}_1 + w\bar{E}_2\bar{z}_2 + w\bar{E}_3\bar{z}_3 + \cdots\cdots\cdots \end{aligned} \qquad (1)$$

This amounts to multiplying the E-curve of Fig. 3 by each of the three tristimulus curves give in Fig. 2 and taking the area under the three product curves. This would appear to be a tedious job, and indeed it is when done with a computing machine. However, reference will be made later to methods for obtaining tristimulus values which are relatively fast.

When a proper conversion factor is applied, Y gives the luminosity of the light entering the eye of the standard observer. The chromaticity of the color (which is comprised of hue and saturation) is obtained from the I.C.I. co-ordinate system or chromaticity diagram through plotting of the *trichromatic coefficients*, which are obtained from all three tristimulus values in the following manner. Simply add the three tristimulus values, and designate the sum as $S = X + Y + Z$; then divide each tristimulus

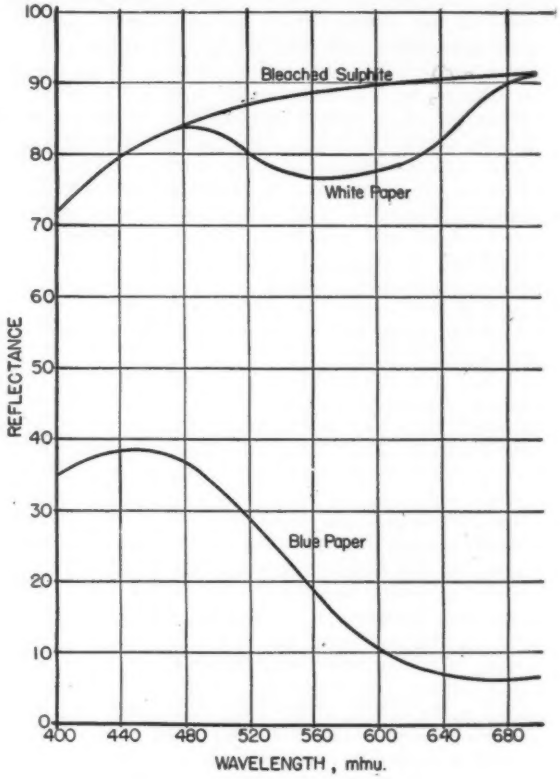

FIG. 1

Spectral reflectivities ("color curves") for undyed bleached sulphite, white paper tinted with blue dye which absorbs light in the yellow region of the spectrum, and blue paper.

value by the sum to obtain the trichromatic coefficients:

$$x = X/S \quad y = Y/S \quad z = Z/S \qquad (2)$$

(One should not confuse the trichromatic coefficients with $\bar{x}$, $\bar{y}$, and $\bar{z}$ appearing in Fig. 2 and equations 1.) It is evident that the trichromatic coefficients sum to unity. As a result, only two of the coefficients are required to be known, since the third is automatically fixed and determined. For example, if y is plotted against x one obtains a diagram on which each point corresponds to a unique set of values of the trichromatic coefficients. This diagram is the I.C.I. coordinate system or chromaticity diagram; it is illustrated in Fig. 4.

When the standard observer's tristimulus values for monochromatic light (Fig. 2) are employed to calculate the trichromatic coefficients (equations 2) and the x and y values are plotted on this diagram, the *spectrum locus* is obtained. This is the curve running from wavelength 380 mmu to 780 mmu (which for nearly all purposes, can be considered to run from 400 to 700 mmu, because the tristimulus values beyond these limits are negligible).

It is a fundamental and important fact that the points on the diagram for all mixtures of any two colors lie on a straight line connecting the two points corresponding to the two colors. Thus the straight line connecting the two ends of the spectrum locus represents all combinations of extreme violet and extreme red monochromatic light; it is, therefore, the locus of most saturated purples. The points for all real colors lie on, or within, the closed figure comprised of the spectrum locus and the locus of most saturated purples.

The points for the three I.C.I. standard illuminants are designated with the letters A, B, and C. Illuminant A has a standardized spectral energy distribution similar to that of an ordinary 100-watt gas-filled tungsten filament lamp and is yellowish in color, illuminant B is a standardization of mean noon sunlight, and illuminant C is a standardization of average daylight (mixed sunlight and sky light, as exemplified by the light on a lightly overcast day). In the United States illuminant C is most commonly employed for reference, and is taken as the "white point." It should be emphasized at this place that the point on the diagram for a perfectly white, diffusely reflecting surface is the same as that of the point for the illuminant used for reference, because the light reflected from such a surface has a relative spectral energy distribution the same as that of the illuminant. In other words, the point for a perfectly white surface would be at A if illuminant A were used for reference, and at C if illuminant C were employed.

The fact that additive mixtures of two colors lie on a straight line on the chromaticity diagram provides a means for characterizing the chromaticity of a color in terms of *dominant wavelength* and *purity*. Let us assume that a green light, represented by the point G, enters the eye of the observer. How does the location of the point indicate what kind of green? Is it blue-green, green, yellow-green, and how strong? It is noted that a straight line drawn from the illuminant point at C through G intersects the spectrum locus at wavelength 524 mmu. This means that the chromaticity of the green light could be obtained by mixing the light of illuminant C and monochromatic light of wavelength 524 mmu in suitable proportion. This wavelength, 524 mmu, is known as the *dominant wavelength* with reference to the specified illuminant. The *purity* is taken as the percentage of the whole distance from C to the spectrum locus covered by the interval between C and G (in the case illustrated, 25.2%). (This is designated *excitation purity* to distinguish it from *colorimetric purity*, with which it is functionally related.) These data, together with Y, the luminosity, completely characterize the color of the light as seen by the standard observer. Any other light of different spectral composition giving rise to the same tristimulus values (and, therefore, the same trichromatic coefficients and same point on the diagram) will have color identical in all aspects, as seen by the standard observer or any real observer whose color vision is the same as that of the standard observer.

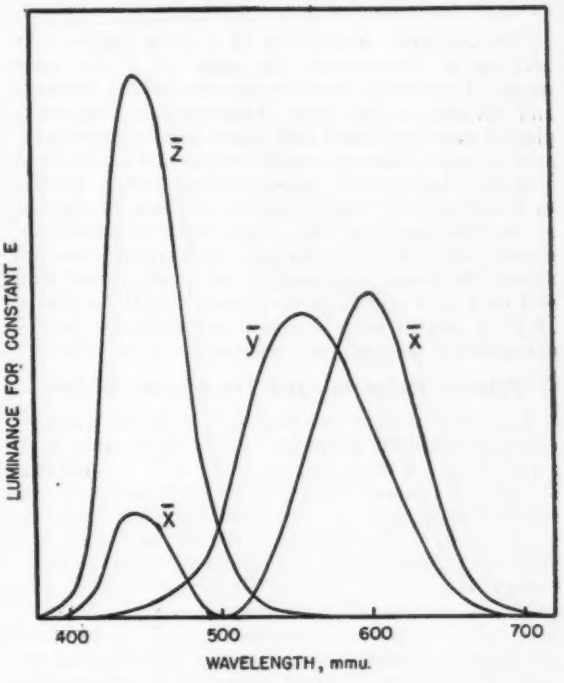

FIG. 2

The tristimulus functions for the I.C.I. standard observer, for uniform spectral energy distribution across the spectrum. These functions are based on the I.C.I. unreal primaries and are positive at all wavelengths. The curve for $\bar{y}$ is also the standard luminosity function.

If the color is a purple whose chromaticity is represented by the point P, the complementary dominant wavelength is obtained. In this case the concept defining the dominant wavelength is that of mixing the purple light with spectrum light to obtain chromaticity matching that of the illuminant which, for illustration, will be C. The procedure for obtaining the dominant wavelength is to construct a straight line through the points P and C to the spectrum locus. The wavelength read from the point of intersection is assigned the letter c to designate it as a complementary dominant wavelength; thus, in the example given in Fig. 4, the dominant wavelength is 541c mmu. The purity, as before, is taken as the percentage of the whole distance from C to the locus covered by the interval from C to P (the locus in this case is that of most saturated purples; in the example given, it is 52.0%.

It is important to note that the *dominant wavelength and purity depend upon the reference illuminant and, hence, the latter must be included in any statement of dominant wavelength and purity.*

The complete description of a color includes, in addition to chromaticity, the value of Y, the luminosity. Luminosity provides the measure of lightness and darkness of the light. However, the luminosity plays a more profound and subtle part in the appearance of color than one might suppose. For example, a certain light might appear orange-yellow relative to a surrounding white field of constant luminance. If the luminosity of the yellow light is greatly reduced, but the chromaticity maintained constant (same dominant wavelength and purity) the light will no longer appear to be yellow; it will be brown. If Y is plotted in a direction perpendicular to the chromaticity diagram, one obtains the *color solid*.

Color of Reflecting and Transparent Bodies

The color of light entering the eye of the standard observer has been discussed. If the light came from a reflecting (or transmitting) body, it is obvious that its spectral characteristics will depend upon *both* the spectral reflectance of the reflecting body and the spectral energy distribution of the illuminant (or the spectral transmission of the transparent body and the energy distribution of the illuminant) (from this point on, statements concerning spectral reflectance apply also to spectral transmission.) It is said that an object is colored when it modifies the spectral energy distribution of light reflected or transmitted by it.

Referring to equations 1, the calculations of the tristimulus values X, Y, and Z will involve, instead of E, the product RE, where R is the reflectance of the body (at a given wavelength) and E is the spectral energy distribution of the illuminant. The tristimulus values are then calculated by means of equations 3:

$$\begin{aligned} X &= wR_1E_1\bar{x}_1 + wR_2E_2\bar{x}_2 + \ldots = w(R_1E_1\bar{x}_1 + R_2E_2\bar{x}_2 + \ldots) \\ Y &= wR_1E_1y_1 + wR_2E_2y_2 + \ldots = w(R_1E_1y_1 + R_2E_2y_2 + \ldots) \\ Z &= wR_1E_1z_1 + wR_2E_2z_2 + \ldots = w(R_1E_1z_1 + R_2E_2z_2 + \ldots) \end{aligned} \quad (3)$$

The products $E\bar{x}$, $E\bar{y}$, and $E\bar{z}$ enter into tristimulus determination so frequently that, as a matter of convenience, values of the products for the three standard illuminants have been calculated and tabulated for many wavelengths of the visible spectrum. Such tabulations may be found in Tables XIII, XIV, and XV of the *Handbook of Colorimetry (19)*.

The determination of the tristimulus values then reduces to obtaining the areas under three curves which are, respectively, the product of the spectral reflectance curve ("color curve") and the curve for $E\bar{x}$, the product of the spectral reflectance curve and the curve for $E\bar{y}$, and the product of the spectral reflectance curve and the curve for $E\bar{z}$.

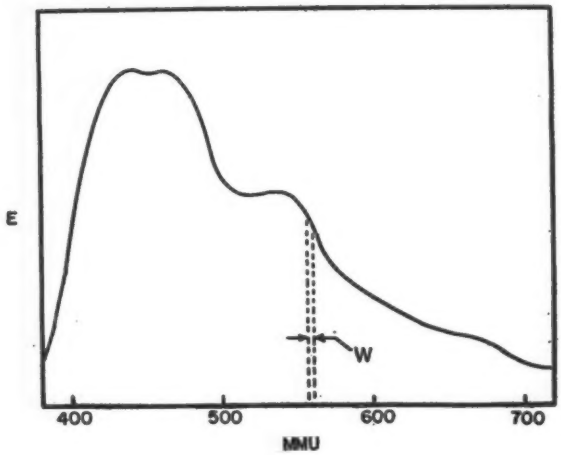

FIG. 3
Spectral energy distribution of light (energy per unit wavelength range) after reflection from a sheet of blue paper.

When dealing with a solid reflecting body, such as paper, Y is termed the *luminous reflectance*, and is a measure of the lightness and darkness of the body. It is *not* the "brightness' with which the papermaker deals so frequently *(22, 23, 24)*; the papermaker's brightness correlates fairly well with Z, although it not numerically the same thing as Z. *The luminous reflectance is the ratio, expressed in per cent, of Y for the reflecting body to Y for magnesium oxide* (the standard of reflectivity).

As stated in the previous section, the calculation of tristimulus values by means of a calculating machine is tedious and time-consuming. This undesirable (but potentially exact) method has been termed the *weighted ordinate method*. Hardy and Pineo *(25)* have developed the *selected ordinate method*, which greatly speeds the work of obtaining the tristimulus values *(19)*. Using the selected ordinate method, one reads reflectance values from the color curve at three sets of predetermined values of wavelength, and sums the readings on an adding machine. On multiplying the three sums by factors, one obtains the tristimulus values. Data are given for ten selected ordinates (30 readings from the curve), 30 selected ordinates (90 readings), and 100 selected ordinates (300 readings) for each of the I.C.I. standard illuminants. Details of procedure and tabulations for both the weighted and the selected ordinate methods are given in the *Handbook of Colorimetry (19)*. Ten selected ordinates appear to be sufficient for white and near-white paper, provided that the color curve exhibits no sharp dips or curvature, in which case 30 selected ordinates should be employed. When the color curve displays steepness and sharp curvature, and where good accuracy is required (more often than not very good accuracy is needed when one is dealing with the color matching of paper), 100 selected ordinates should be used.

About ten years ago, at the Institute, it was anticipated that academic and co-operative work in color might be seriously impeded by the slowness of calculation of tristimulus values. It was felt that the task might be performed accurately and rapidly by means of a mechanical integrator which would multiply and integrate the R and the $E\bar{x}$, $E\bar{y}$, and $E\bar{z}$ curves in a *continuous* rather than discrete manner. During the summer of 1937, a mechanical integrator for the purpose was designed and constructed *(26)*, and in the following winter the instrument was used, in one study alone, for many hundreds of integrations. The time required for the machine to perform an integration is only 55 seconds, and all three tristimulus values, with check determinations, can be obtained in several minutes. The constants of the instrument were so chosen that the dials yield tristimulus values directly, without the necessity for multiplication by factors. Even at the highest speed of normal operation of the integrator the accuracy (about 0.1 to 0.2%) is better than necessary for most practical uses; in special cases where a high degree of accuracy is required, somewhat lower speed of operation and special procedures provide the required refinement. One of the advantages of mathematical machines of this type is that "blunders" of

the sort which invariably arise where one must deal with numerous data are virtually eliminated. Through use of integrators of the kind referred to, it is possible to eliminate the "bottle neck" in the work of obtaining I.C.I. tristimulus data from color curves.

Having obtained the tristimulus values (*X*, *Y*, and *Z*), one then obtains the trichromatic coefficients as outlined in the previous section. The point (*x*, *y*) is located on the I.C.I. chromaticity diagram and the dominant wavelength and purity (for the given standard illuminant, usually illuminant C) are read from the diagram. These data, with *Y*, the luminous reflectance, describe the color of the sample of paper, as seen by the I.C.I. standard observer. In a report of I.C.I. colorimetric data, it is well to include either the tristimulus values or the trichromatic coefficients. It is customary to calculate the trichromatic coefficients to four figures (for example, $x = 0.3564$, $y = 0.2893$) because, as a rough and ready rule, the normal eye is sensitive to chromaticity changes on the I.C.I. diagram of the order of 0.001.

The good sensitivity of the normal eye to *chromaticity* changes requires, in many cases, high accuracy in both the color curve and in the determination of tristimulus values. A number of persons in the industry, having presumably only an *a priori* basis for judgment of what constitutes a small difference between color curves, have made the error of supposing that a 1% difference in reflectance is of no importance. Depending on the nature of the curves, a difference of 5% may be huge or trivial. If the curves differ uniformly by 1% in the sense that the higher curve can be obtained by multiplying the lower one by 1.01, there will be *no chromaticity difference;* there will be only a difference in luminous reflectance (to which the eye is not so sensitive) of 1%, and the color difference may not be perceptible. If, however, the two curves are everywhere coincident except in, for example, the blue region, where the average difference is 1%, a much more noticeable color difference will exist, because the chromaticities will be different. Similar comment could be made for curves differing only in the green or middle portion of the spectrum, or in the red portion. The difference in color will generally be still greater if the curves coincide in one portion of the spectrum and differ in the other two. Thus it is basically wrong, in mill control of color, to place "go" and "no go" zones on the two sides of the color curve for a standard color. A specimen whose curve hugs either the upper or lower limit of such a zone will have color more similar to that of the standard than will another specimen whose curve passes across the zone from low at one end to high at the other end—even though the curve for the latter seems on the average to be in better agreement with the standard. In important cases of dispute, computation of I.C.I. colorimetric data should be helpful.

MacAdam *(27)* has published valuable data on the visual sensitivity of normal observers to chromaticity differences at constant luminosity. His data are presented in terms of standard deviation, which is thought to be about one third of a just noticeable difference. In another work *(28)*, it has been found that the sensitivities of normal observers differ appreciably and that for certain directions of change on the chromaticity diagram the sensitivity is quite low when the luminosity may change, as it does in actual color problems. A glance at the *Y*-values will indicate whether or not the sensitivity data published by MacAdam may be applied.

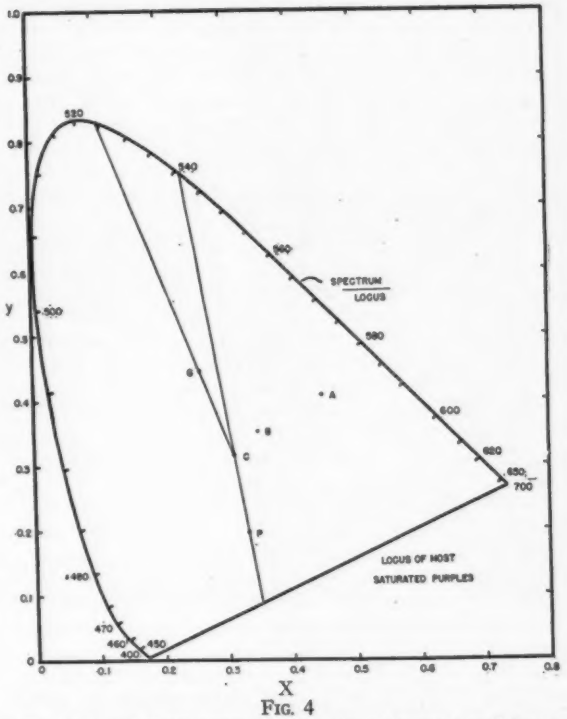

FIG. 4

The I.C.I. co-ordinate system, in which the trichromatic coefficient *y* is plotted against the trichromatic coefficient *x*. All real colors fall within the closed figure. The I.C.I. unreal primaries are located at (0, 0), (0, 1), and (1, 0), and the triangle obtained by connecting these points embraces the closed figure which bounds all real colors. For illustration, the white point is here taken at C, and the dominant wavelengths for a green (point G) and a purple (point P) are, respectively, 524 mmu and 541*c* mmu.

Because of the accuracy required in plotting trichromatic coefficients, special charts, each a magnification of a portion of the chromaticity diagram, have been prepared by the Color Measurement Laboratory of the Massachusetts Institute of Technology and are included in the *Handbook of Colorimetry (19)*. These excellent charts (extra copies of which can be obtained from The Technology Press of M.I.T.) are furnished with numerous lines of constant dominant wavelength and curves of constant purity.

Some Applications of the I.C.I. System in the Paper Industry

White and near-white papers have chromaticities represented by points on the chromaticity diagram not far removed from the reference illuminant point (the white point is usually illuminant C at $x = 0.3101$ and $y = 0.3163$). Experience has shown that hue becomes visually almost indeterminate when the purity is low—that is, between zero and a few per cent; in this area of the chromaticity diagram, "whiteness" appears to be most strongly characterized by *purity* and *luminous reflectance (Y)*. This is not to say that dominant wavelength is of no importance; the value of dominant wavelength should be included as a description of the hue of the "white."

When dealing with white papers, one tends to use such terms as "blue-white." Quite often this is a relative matter and a "blue-white" sheet may actually be yellow, but have purity much lower than that of another sheet with which it is compared. This matter of apparent hue difference is very interesting. An observer will tend to see a color (of white paper) in accordance with data from the chromaticity diagram if he views the specimen with a surround of mag-

nesium oxide or other neutral field. However, if the surrounding field is another white paper of different chromaticity, there is a *tendency* for the observer unconsciously to make his judgment relative to a white point on the diagram at the chromaticity of the surround. Thus, the central area may be yellowish but appear pinkish if its chromaticity point lies between the point for the surround and the area of red-purples; when the surround is covered with a neutral color, the central area will appear yellowish.

Foote *(5)* has shown that, in the tinting of white papers, the chromaticity changes produced by dyeing move along smooth curves on the I.C.I. diagram. Starting with an unbleached sulphite at dominant wavelength 577 mmu and purity 14.5%, the addition of small amounts of Paper Blue R caused the chromaticity to move almost directly toward the white point (illuminant C); greater additions caused the chromaticity to move past the white point into the area of blue. The color became a true "blue-white" when the chromaticity passed the white point.

In his comprehensive work, Foote studied the influence of a number of weights of dyes on the color curves and on chromaticity and luminous reflectance. The loci on the chromaticity diagram for different weights of various dyes were found to radiate from the point corresponding to the undyed pulp in curved lines which, though smooth, follow no regular pattern. Foote also obtained the variation of luminous reflectance with weight of dye, and explored the loci on the chromaticity diagram for some mixtures of dyes.

The chief value of Foote's data on chromaticity and luminous reflectance is in the indication of the colors that can be realized with the various dyestuffs and their combinations. In general, there is no procedure quite as good as that of working with families of color (spectral reflectivity) curves for different weights of the dyestuffs ordinarily employed. There are situations, however, in which a submitted color is unusual and in which the complexity of the color curve makes it difficult or impossible to infer the exact nature of the colorants. It then becomes helpful to determine the chromaticity and luminous reflectance of the sample and refer to data of the sort obtained by Foote. This will usually be suggestive of the kinds and approximate amounts of dyestuffs to employ; the color curves can then be employed to refine the match.

It is rarely ever the case that paper can be manufactured with a color that matches that of a submitted sample in the ideal sense that the color curves will be nearly identical for all wavelengths. Because of differences between the color curves of the pulps, differences in retention of dyes, variability of dyestuffs, machine effects, etc., the color curves ordinarily will cut across each other in two or more points. But, if the chromaticities and luminous reflectance are the same, the colors will be alike to the standard observer* viewing under a standard illuminant. However, the match would be different under any other illuminant (unless by pure chance the integrations gave rise to the same tristimulus values). For a given standard illuminant, at least, the I.C.I. system enables one objectively to settle a dispute among two or more color matchers, or between the manufacturer and buyer.

A paper mill wishing to standardize upon a line of colors will find that the most permanent and most generally useful and satisfactory method is that of filing the color curves. The I.C.I. standard observer and co-ordinate system will be found useful if, at some later time, changing conditions have made it impossible to duplicate the color curves with sufficient exactness. The color adjustments can then be made to obtain tristimulus values equal to those computed from the standard curves on file; standard illuminant C is suggested for this purpose where use of the paper does not specifically call for some other illuminant (such as tungsten filament light, in which case illuminant A should be employed). Unless there is a special desire to have the standard line of colors expressed in terms of dominant wavelength, purity, and luminous reflectance, it would appear to be a waste of time to compute the I.C.I. data for the complete line of colors. As indicated above, such computations can be made from the recorded color curves on file if and when the occasion arises.

In brief summary, the I.C.I. standard observer and co-ordinate system furnish an objective and accurate psychophysical bridge between purely physical data and color sensation as experienced by the average person having normal color vision. Without such a system, an experienced person could only infer from a submitted color curve that the color would be, for example, "some sort of blue-green, of low purity"; the I.C.I. data, however, give exact expression of the color in terms of dominant wavelength, purity, and luminous reflectance.

* The geometrical condition of *viewing* equivalent to the geometry of illuminating and viewing employed in the G. E. recording spectrophotometer is that of general, diffuse illumination, with the line of sight perpendicular to the plane of the paper.

Literature Cited

1. Hatch, R. S., and Hauff, H. A., *Pac. Pulp Paper Ind.* 7, No. 10: 11-14 (Oct., 1933); *Paper Trade J.* 97, No. 26: 34-36 (Dec. 28, 1933); *Tech. Assoc. Papers* 17: 433-435 (1934).
2. Lewis, L. C., *Paper Trade J.* 103, No. 22: 43-50 (Nov. 26, 1936).
3. Harrison, Ward D., *Paper Trade J.* 105, No. 13: 39-45 (Sept. 23, 1937); *Tech. Assoc. Papers* 20: 314-320 (1937).
4. Nolan, Philip, *Paper Trade J.* 105, No. 14: 42-45 (Sept. 30, 1937); *Tech. Assoc. Papers* 20: 336-339 (1937).
5. Foote, William J., *Paper Trade J.* 108, No. 10: 33-40 (March 9, 1939); *Tech. Assoc. Papers* 22: 535-542 (1939).
6. Foote, William J., *Paper Trade J.* 109, No. 25: 31-38 (Dec. 21, 1939); *Tech. Assoc. Papers* 22: 397-404 (1939).
7. Rand, W. E., *Pulp Paper Mag. Can.* 41, No. 1: 13-18 (January, 1940).
8. Hatch, R. S., *Paper Trade J.* 111, No. 12: 35-38 (Sept. 19, 1940); *Tech. Assoc. Papers* 23: 491-493 (1940).
9. Griesheimer, R. N., *Paper Trade J.* 111, No. 13: 36-41 (Sept. 26, 1940); *Tech. Assoc. Papers* 23: 494-499 (1940).
10. Foote, William J., *Paper Trade J.* 111, No. 15: 31-38 (Oct. 10, 1940); *Tech. Assoc. Papers* 23: 505-512 (1940).
11. Simerl, Linton E., *Tech. Assoc. Papers* 23: 114-128 (1940).
12. Kimble, Glenn C., *Paper Trade J.* 115, No. 3: 37-46 (July 16, 1942); *Tech. Assoc. Papers* 25: 341-350 (1942).
13. Kress, Otto, and Loutzenheiser, Edwin J., Jr., *Paper Trade J.* 114, No. 11: 37-40 (March 12, 1942); *Tech. Assoc. Papers* 25: 243-246 (1892).
14. Parsons, Shirley R., *Tech. Assoc. Papers* 25: 360-368 (1942).
15. Kress, Otto, and Trucano, Peter, *Paper Trade J.* 117, No. 10: 31-38 (Sept. 2, 1943); *Tech. Assoc. Papers* 26: 245-252 (1943).
16. Adrian, Alan P., *Paper Trade J.* 119, No. 15: 35-41 (Oct. 12, 1944); *Tech. Assoc. Papers* 27: 465-471 (1944).
17. Smith, T. A., and Guild, J., *Trans. Optical Soc.* 33, No. 3: 73-130 (1931-32).
18. Judd, Deane B., *J. Optical Soc. Am.* 23, No. 10: 359-374 (October, 1933).
19. Hardy, A. C., *et al.*, Handbook of Colorimetry. Cambridge, The Technology Press, Massachusetts Institute of Technology, 1936. 87 p.
20. The Institute of Paper Chemistry. Instrumentation Studies XX. *Paper Trade J.* 105, No. 18: 135-141; No. 19: 27-39 (Oct. 28, Nov. 4, 1937).
21. Committee on Colorimetry of the Optical Society of America. The following chapters have been published: Chapter II, *J. Optical Soc. Am.* 33: 544-554 (1943); Chapter V, *Ibid.* 34: 183-218 (1944); Chapter VI, *Ibid.* 34: 245-266 (1944); Chapter VII, *Ibid.* 34: 633-688 (1944); Chapter VIII, *Ibid.* 35: 1-25 (1945).
22. Van den Akker, J. A., Nolan, Philip, and Wink, Willmer A., *Paper Trade J.* 114, No. 5: 34-40 (Jan. 29, 1942); *Tech. Assoc. Papers* 25: 263-269 (1942).
23. TAPPI. Brightness of pulp. Tentative Standard T 217 m-45. Tech. Assoc. Pulp Paper Ind., New York.
24. TAPPI. Brightness of paper. Tentative Standard T 452 m-45. Tech. Assoc. Pulp Paper Ind., New York.
25. Hardy, A. C., and Pineo, O. W., *J. Optical Soc. Am.* 22, No. 7: 430-A (July, 1932).
26. Van den Akker, J. A., *J. Optical Soc. Am.* 29, No. 9: 364-369 (September, 1939).
27. MacAdam, David L., *J. Optical Soc. Am.* 32, No. 5: 247-274 (May, 1942). See also, same author, *J. Optical Soc. Am.* 33, No. 1. 18-26 (January, 1943).
28. Van den Akker, J. A., Todd, J. E., Nolan, Philip, and Wink, Willmer A., *J. Optical Soc. Am.* 37, No. 5: 363-387 (May, 1947). Report No. 34, Part II, to the American Paper and Pulp Association, New York.